

Student Information System

Requirement Specifications

March 11, 2025

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UIS & Student Community

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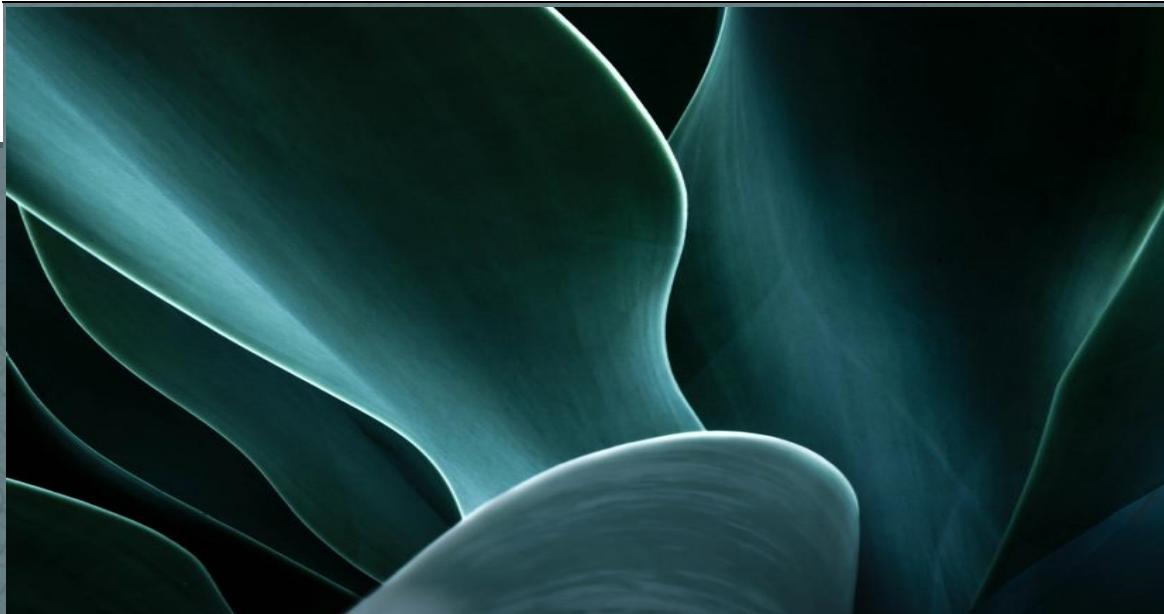
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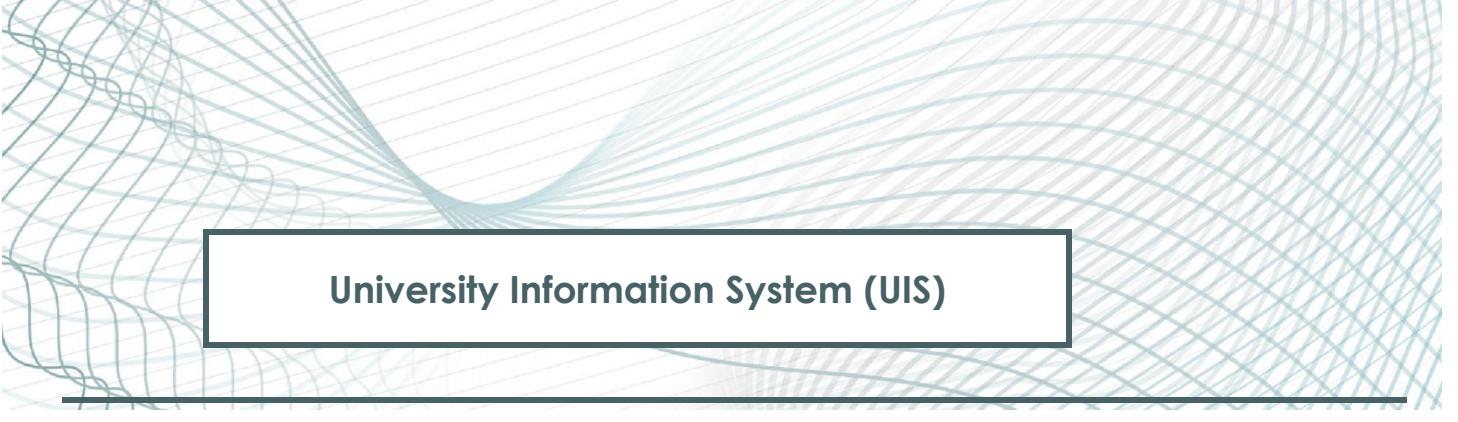
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Project Overview

Our vision is to develop a student-centric system, designed to prioritize their needs and experiences. This system will encompass two integrated software solutions: one dedicated to the internal management of university operations and the other tailored to fostering a vibrant student community. These software applications will be offered as a comprehensive package. Universities that adopt this system will provide their enrolled students with full access to both platforms. However, individuals not affiliated with a participating university will still be able to access the community software independently.





University Information System (UIS)

Product Context

The first software is for the internal management of the university. This system is bought by the universities in e Albania.

The **stakeholders** of this system include:

- Students
 - Academic Staff
 - Finance Office
 - Admissions Office
 - Career Office
 - ICT Coordination
 - Registrar's Office
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User Characteristics:

- User Authentication and Profile Management ensures secure access and management of user accounts and profiles.
- **Students** can access grades, selected courses, financial details, attendance records, transcripts, and student guidelines, and can enroll in classrooms.
- **Admissions Office** uploads the primary data of matura students upon signing their university entry contracts.
- **Academic staff** manages the syllabus, classroom materials, attendance records, grades, and perform academic reporting.
- **Finance Office** oversees student billing, payment tracking, financial aid management (including scholarships), and generates financial reports.
- **Career Office** facilitates job and internship postings, resume and interview preparation, and alumni networking.
- **Registrar's Office** maintains student records, uploads additional exam grades, processes exam requests, handles transcript requests, schedules courses, and performs degree audits.
- **Dean of Students** publishes student guides, fosters involvement in extracurricular activities, and generates club activity reports.



ThinkLink – Connecting through learning

Product Context

This system consists as a help for the students at different aspects such as videos, meeting with professionals, simulations, flashcards and other aids.

The **stakeholders** of this system include:

- Students
 - Teacher and Instructors
 - Educational Institutions
 - Content Providers
 - Regulatory Bodies
 - Partners and Sponsors
 - Company representatives
 - Developers and IT Support Team
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User Characteristics:

- **Students:** Students can enroll in classes, access a variety of learning tools like flashcards, games, and simulations, attend seminars, take practice tests with performance feedback, use a Pomodoro timer for productivity, participate in Q&A hubs, manage digital textbooks, and explore educational curiosities to deepen their knowledge.
- **Content Providers:** Content providers can create and manage educational content, such as flashcards, tests, videos, and simulations; assign specific resources to students based on curriculum needs; and moderate Q&A hubs to ensure quality and relevance of content.
- **Educational Institutions:** Educational institutions are responsible for reviewing and approving or rejecting classes created under their name and can oversee requests, existing courses, and related content to maintain standards.
- **Administrators:** Administrators manage and moderate past exam papers to remove low-quality or non-compliant ones and ensure that flagged content in Q&A hubs adheres to community guidelines.
- **Company Representatives:** Company representatives are tasked with adding career-related opportunities for students by creating and managing resources, such as internship listings, job boards, and career-oriented seminars or workshops.

Constraints:

1. **Scalability:** The system must handle a growing number of users and data without performance degradation.
2. **Budgetary Limitations:** The cost of development, deployment, and maintenance must align with the university's financial resources.
3. **Interoperability:** Compatibility with existing university systems (e.g., learning management systems, student portals).

Dependencies:

1. **Technological Infrastructure:** Reliable servers, databases, and network connectivity to support the system.
2. **Stakeholder Input:** Collaboration with faculty, students, and administrators to ensure the system meets their needs.
3. **Content Availability:** Dependence on educators and students to populate the platform with relevant educational materials.
4. **Maintenance and Support:** Ongoing technical support and updates to address bugs and improve functionality.

Requirements - UIS

For this software the requirements are separated based on the user level.

- For entrance to the system, if the user is a part of campus community he will enter the university email and password, and automatically the user will have access to both the UIS and the student's community.
- If the person is not part of any registered university he will have access only in the community program and it is not allowed to enter to the UIS program. If any other user tents to access it, he will get a message "Access blocked". In the community the user can enter to the software if they have payed a fee using the payment by card.

Functional Requirements

1. ***Student Registration Process***

1. **Admission Office**
 - Collects and verifies the necessary student information for university registration.
2. **Contract Signing & Fee Payment**
 - Student signs the contract to confirm admission.
 - **Finance Office** verifies and confirms tuition fee payment.
3. **Registrar's Office**
 - Receives the student's information after finance approval.
 - Creates and maintains the student profile with all related data.
4. **Email Account Creation**
 - System automatically generates a university email account for the student.
 - Email is required for academic and administrative communication throughout the academic year.

2. ***Attendance Tracking Process***

1. **Faculty Member (Lecturer/Instructor)** records attendance per session (Present, Absent, Late).
2. **System** updates attendance percentage in real-time and flags students below the required threshold.
3. **Student** can view their attendance breakdown by course and week.
4. **Academic Coordinator/Department Head** monitors attendance reports and ensures compliance with university policies.
5. **Registrar's Office** enforces attendance policies, issuing warnings or taking necessary actions based on attendance records.

3. Course Selection & Enrollment Process

1. **Registrar's Office** verifies student eligibility (contract signed, tuition paid).
2. **Finance Office** confirms fee payment and financial approval.
3. **Student** accesses the course selection system based on academic level restrictions (Freshman, Sophomore, Senior).
4. **Academic Advisor** gets a notification about the student selections, approves or rejects selected courses.
5. **Registrar's Office** finalizes enrollment, and the student's course list is updated.
6. **System** updates timetable and enables access to course materials.

4. Academic Performance & Grading Process

1. **Student** selects the academic year and semester to view grades.
2. **Faculty** enters and finalizes grades for assessments (quizzes, exams, projects).
3. **System** automatically calculates weighted final grades based on grading criteria.
4. **Professors** have the ability to apply grade curves before finalizing results.
5. **Registrar's Office** confirms and uploads final grades.
6. **ICT Office** can unlock grades for editing if corrections are needed after finalization.
7. **Student** accesses final grades in both letter and numeric format.
8. After final approval, grades are automatically recorded in the student's transcript.
9. Weighted final grades and GPA calculations are updated accordingly.

5. Document Request & Processing

1. **Student** submits a document request (transcript, certificate, etc.).
2. **Registrar's Office** reviews and processes the request, prepares the document, updating the request status.
3. **System** notifies the student when the document is ready.
4. **Student** must complete the required payment at the **Finance Office** before collecting the document.
5. **Student** collects the document in person or downloads a digital copy if available.

6. Classroom & Learning Management

1. **Student** joins a course classroom using a code provided by the professor.
2. **Faculty** uploads syllabi, lecture materials, assignments.
3. **Students & Faculty** engage through posts, announcements, and discussions.
4. **System** displays upcoming assignments and submission deadlines.

7. Professional Practice & Career Services Process

1. **Student** uploads CV and applies for available internships.
2. **Career Office** reviews applications and connects students with companies.
3. **System** tracks application status (submitted, approved, rejected).
4. **Student monitors** progress and receives updates on job placement.
5. **Career Office** can add new companies into the system, including name, logo, and description.
6. **System** maintains a company directory for student reference.

8. Student Applies for Additional Exams

1. Students submit an application for additional exams through the system.
2. **Registrar's Office** reviews the request based on university policies.
3. If approved, the additional exam is scheduled, and the student is notified.
4. Faculty conducts and evaluates the additional exam.
5. The new grade is recorded in the system.

9. Timetable Scheduling Process

1. **Admission Office** creates and finalizes the semester timetable.
2. System auto-generates schedules based on faculty availability and student enrollments.
3. **Registrar's Office** reviews the schedules to ensure they follow university policies, avoid class overlaps, and meet room capacity limits, resolving any issues found
4. **Head of department** assigns courses to the academic staff, in alignment with department requirements.
5. Classrooms and labs are allocated according to student capacity and course type.
6. **Students** access their schedules through the university portal.
7. System updates and notifies **students** and **faculty** of any schedule changes.
8. **Students** can request timetable modifications during the add/drop period
9. **Academic Advisors** and **Registrar's Office** review and approve schedule change requests.

10. Degree Audit Process

1. **Registrar's Office** retrieves student academic records.
2. **System** analyzes completed courses, earned credits, and remaining requirements.
3. **System** generates a degree audit report, displaying progress toward graduation.
4. **Registrar's Office** verifies if the student meets graduation eligibility criteria.
5. **System** highlights missing courses or credits if requirements are unmet.
6. **Student** receives notifications regarding degree progress and remaining coursework.
7. **Registrar's Office** updates the audit status once graduation requirements are fulfilled

Nonfunctional Requirements

- **Product Requirements**

These define how the product must behave, focusing on usability, performance, reliability, and functionality.

- **Usability Requirements**

1. An intuitive interface for students, faculty, and staff to ensure smooth navigation across functions (e.g., course selection, grading, financial information access) by using descriptive names and easy interfaces.

- **Performance Requirements**

2. The system must handle up to 5,000 concurrent users during peak times without delays (more than 2 seconds) or crashes.
3. Response time for actions like grade updates or course selections must be less than 2 seconds.
4. Real-time updates shall be provided for student and financial information, ensuring no duplication of data.
5. The system shall accommodate increasing numbers of users and additional university departments without a reduction in performance.

- **Organizational Requirements**

These arise from organizational processes, policies, or internal standards.

6. Users shall authenticate their access to the system through two forms of verification: primary authentication(A valid username and password); secondary authentication(A one-time passcode (OTP) sent via email, SMS, or a designated authenticator app.)
7. Restrict access to the University Information System (UIS) to users with verified school accounts (no external or unauthorized accounts allowed).
8. Sensitive information, such as financial and personal data, must be encrypted both at rest and in transit.
9. The registration process for students shall not take longer than 10 minutes to complete.
10. The system shall support up to 2,000 student registrations per day.
11. Faculty shall submit grades and attendance updates for each student within a maximum of 2 weeks after classes conclude; updates beyond this period shall not be permitted.
12. The system shall guarantee 99.9% availability, with automated backups and disaster recovery protocols in place.

- **External Requirements**

These result from external factors such as legal, regulatory, or cultural considerations.

13. The student registration must be held within the registration period specified by the Educational Ministry.



Requirements - ThinkLink

Functional Requirements

1. Class Enrollment & Access Process (Student & System)

1. A **content provider** creates a new class and assigns it to a university.
2. The **university** receives an automatic notification of the new class request.
3. The **university representative** approves or rejects the request.
4. If approved, the class is added to the university's list of official courses.
5. If rejected, the content provider receives a rejection notification with feedback.

2. Class Creation & University Approval (Content Provider & University Representative)

1. The **system** displays available and enrolled classes for students.
2. A **student** selects a class and clicks "Enroll."
3. The **system** updates the student's enrollment status and grants access to class materials.
4. Only enrolled **students** gain access to interactive features (tests, flashcards, games, and seminars).
5. The **system** enforces restrictions for non-enrolled students (viewing only materials but no participation).

3. Test & Seminar Participation (Student & Content Provider)

1. A **content provider** creates a test or schedules a seminar.
2. Enrolled **students** receive a notification about the test or seminar.
3. **Students** access and participate in the test or seminar at the scheduled time.
4. The **system** records test responses and seminar attendance.
5. The **content provider** reviews test results and seminar participation data.
6. **Students** receive feedback on their test performance

4. Seminars Process

1. **Content Providers** create and manage seminars, including details such as topic, speaker(s), date, time, and delivery mode.
2. **Students** register for seminars and receive automated reminders via email or in-app notifications.
3. Online Seminars support interactive features such as live chat, Q&A sessions, and polls to enhance engagement.
4. **System** stores recorded seminars, allowing students to access and replay them later for reference.

5. Simulations and Video Explanations Process

1. **Student** explores complex concepts through interactive simulations in a virtual environment.
2. **System** allows students to pause, rewind, and stop the video for better comprehension.
3. **Platform** provides video explanations for key topics, created by subject-matter experts.
4. **System** recommends related simulations and video explanations based on students' learning progress by analyzing their past interactions, quiz results, frequently accessed topics, and areas where they need improvement.
5. **Content Providers** assign specific simulations and video lessons for a specific category for all students.

6. Practice tests and Quizzes:

7. **Student** takes timed and untimed practice tests with various question types, including multiple-choice, short answer, and essay-style questions.
8. **System** provides auto-grading and instant feedback to enhance learning.
9. **System** generates performance reports and analytics to help students identify strengths and weaknesses.
10. **Student** monitors progress, reviews detailed explanations of correct answers, and revisits previous exam attempts.
11. **Content Provider** clicks the "Create Test" button to design multiple questions and uploads the test to the system with its name specified.

Q&A Hub Processes

7. Create, Answer, and Interact with posts

12. **User** logs in to the system.
13. **User** creates a new post or question by entering a title, category, description, and tags.
14. **User** submits the post, and the system displays it in the relevant category.
15. Other **users** can view the post and respond by submitting answers or comments.
16. **Users** can upvote or downvote both questions and answers based on usefulness and accuracy.
17. The **original poster** can mark a response as the "Best Answer" to highlight the most helpful solution.
18. **System** sends notifications when users receive responses, comments, or mUISentions.

8. Content Moderation and Management

19. **User** flags inappropriate, spam, or off-topic content.
20. **Moderators** receive notifications of flagged content.
21. **Moderators** can edit, hide, or remove content that violates guidelines.
22. **Content Providers and Academic Staff** can also edit or delete inappropriate posts.

9. Search and Discover Content

23. **User** enters keywords or phrases into the search bar.
24. **System** retrieves relevant questions, answers, and discussions.
25. **User** browses the results and selects the most relevant content.

10. Set Up and Customize Pomodoro Timer

26. **User** navigates to the Pomodoro Timer feature.
27. **User** configures settings, including work session length, break duration, and cycle count.
28. **User** starts the timer, and the system begins tracking the session.
29. The **system** notifies the user when the work session ends and break time starts.

11. Task Management and Progress Tracking

30. **User** creates a list of tasks to complete during sessions.
31. **User** edits or deletes tasks as needed.
32. The **system** tracks completed tasks and displays progress.
33. Notifications remind users to start new sessions if inactive.

12. Flashcard Creation & Management

1. A **content provider** creates flashcards by adding text, images, or mathematical formulas.
2. The **system** saves the flashcard on the class and allows organization into categorized decks.
3. The **content provider** can edit, update, or delete flashcards as needed.

13. Flashcard Access & Study Modes

1. A **student** browses or searches for flashcard decks using keywords, tags, or subjects.
2. The **system** displays available flashcards, and the student selects a study mode:
 - Standard Mode (flip front and back of cards).
 - Quiz Mode (multiple-choice or fill-in-the-blank).
 - Spaced Repetition Mode (adaptive review based on performance).
3. The **student** can shuffle cards for randomized practice.

14. Search, Tracking & Gamification

1. A **student** searches for flashcards using keywords, tags, or subjects.
2. The **system** uses the Spaced Repetition ¹ to suggest flashcards that need revision based on past performance.
3. The **system** tracks progress, providing mastery analytics and revision suggestions.
4. **Students** earn points and badges for completing revision tasks.
5. **Students** can participate in weekly/monthly challenges where they compete on quiz scores or streaks to earn additional rewards.

¹ Spaced repetition is a special algorithm which helps decide when to show a flashcard again based on how well the student remembers it. If they struggle, it appears sooner; if they remember well, it appears later.

15. Job and Internship Listings

1. A **company representative** posts job and internship listings on the platform, providing details like company name, role description, and application deadlines.
2. The **company representative** categorizes listings by industry, location, and job type (full-time, part-time, remote).
3. **Students** search using filters (industry, location, job type), and the system displays relevant results.

16. Profile Creation & Customization

1. A **student** creates a career profile, entering details about their education, skills, and work experience.
2. The **student** can edit their profile at any time to update relevant information.

17. Search & Application Process

1. A **student** searches for internships or job opportunities using keywords, location, job type, or experience level.
2. The **student** selects a job or internship and applies directly by attaching relevant documents (e.g., resume, cover letter).
3. The **company representatives** can shortlist candidates, contact them for interviews, or reject applications.
4. The system updates the application status (e.g., shortlisted, interview scheduled, rejected) and notifies students accordingly.

18. Virtual Career Fairs & Events

1. **Company representatives** host virtual career fairs or webinars to interact with students.
2. **Students** attend these events to learn more about job opportunities and network with company representatives.

19. Past Papers Process

1. **Student** uploads, categorizes, and searches past exam papers, quizzes, and assignments based on university, course, subject, and academic year.
2. **System** allows students to preview past papers before downloading and enables them to rate, review, and provide feedback to ensure quality and relevance.
3. **Administrators** use moderation tools to review and remove past papers that violate content guidelines or are of low quality.

20. Textbooks

1. **System** provides a digital library where students can browse and search for textbooks categorized by title and course.
2. **Students** can download textbooks and access them through an integrated reader with highlighting and bookmarks.
3. **System** checks the textbook's availability.
3. **Content Providers** uploads educational materials.

21. Curiosities:

1. **Students** can create and submit their own curiosities by sharing educational facts, insights, or thought-provoking questions. They can add relevant tags, select appropriate categories, and provide a detailed description for each submission.
2. **The system** allows users to browse, explore, and discover educational facts, curiosities, and insights across various academic fields. Content is categorized by subject, trending topics, and user preferences, ensuring a personalized learning experience.
3. **Students** can engage with curiosities by liking, commenting, and sharing them within the platform. Discussion forums enable deeper academic debates, while a bookmarking feature allows users to save curiosities for later reference.

Nonfunctional Requirements

- **Product Requirements**

These specify how the product must behave, including usability, performance, availability, and security requirements.

- **Usability Requirements**

- The platform must offer a user-friendly and visually appealing interface for students, teachers, and content providers to ensure smooth navigation across functions such as course management, collaboration, and content delivery.
- All core features, such as course creation, grading, and video conferencing, shall be accessible from the homepage within 3 clicks or fewer.
- Interface components (e.g., buttons, menus) must respond to user actions (e.g., clicks, taps) within 1 second.

- **Performance Requirements**

3. The system must support up to 10,000 active users at any given time without delays, crashes, or degraded performance.
4. Loading time for videos, flashcards, and simulations must not exceed 3 seconds.
5. The system must seamlessly scale to accommodate:
 - A 10% annual growth in the number of users.
 - Addition of at least 50 new courses per quarter and 3 new institutions per year without impacting system performance.
6. The platform shall maintain optimal performance with an average response time for core actions (e.g., enrolling in courses, submitting assignments) not exceeding 2 seconds, even under increased usage.

- **Availability Requirements**

7. The community system must ensure 24/7 availability for students worldwide, with redundancy solutions to prevent downtime.
8. Automated failover systems and disaster recovery mechanisms shall ensure data is restored within 15 minutes in case of a system outage.
9. A 99.9% uptime guarantee shall be enforced, meaning downtime shall not exceed 8.76 hours annually. Scheduled maintenance shall occur during off-peak hours (e.g., 2 AM–5 AM UTC) and must not exceed 4 hours per month.

- **Security Requirements**

10. For the Student Community, users must register an account specifically for the platform. Access will require payment of a fee, after which users can log in with their registered account.

- **Organizational Requirements**

These arise from organizational processes, policies, or internal standards.

11. The platform must support a minimum of 10 languages (e.g., English, Spanish, Chinese) and allow users to select their preferred regional settings (e.g., time zone, currency format) during account setup.
12. Language translations must not exceed a 2-second delay during content rendering (e.g., interface text and course descriptions).

- **External Requirements**

These result from external factors such as legal, regulatory, or cultural considerations.

13. The platform shall actively monitor and prevent the dissemination of harmful, discriminatory, or offensive content, ensuring a safe and inclusive environment that encourages collaboration and mutual support among students.



UIS & Students Community

Nonfunctional Requirements for both

- **Product Requirements**

These focus on how the product must behave, including functionality, usability, and performance:

1. The software must allow easy updates, bug fixes, and feature enhancements to meet the evolving needs of users through continuous refactoring.
2. Both systems must be accessible via web browsers and mobile devices (iOS/Android) with full functionality on each platform.

- **External Requirements**

These are driven by external factors, such as legal, regulatory, or regional constraints:

3. The platform shall comply with the Albanian Law "For the Protection of Personal Data," ensuring that students' personal and academic information is securely stored, processed, and accessed only for educational purposes.
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Use Case

UC Name	UIS -UC-1
Summary	(Students Registration Process): This requirement depicts the registration of a student in the system by the university.
Dependency	No dependencies
Actors	Student, Admission Office, Finance Office, Registrar's Office
Preconditions	The matura students data and the required documents (matura diploma) must be available to the Admission Office.
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The student provides the necessary personal and academic information. • Step 2: The admission office records the student information. • Step 3: The admission office verifies the student information for university registration. • Step 4: The admission office prepares the contract. • Step 5: Student signs the contract to confirm admission. • Step 6: Finance Office verifies tuition fee payment. • Step 7: Finance Office confirms tuition fee payment. • Step 8: Registrar Office receives the student's information after finance approval. • Step 9: System automatically generates a university email account for the student. • Step 10: Registrar Office creates the student's profiles. • Step 11: Registrar Office maintains the student's profiles.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 3: If the student information are not correct or invalid the admission office notifies the student. • Step 5: Finance office may reject or approve the tuition fee payment. If rejected the registration process interrupts.
Non functional requirements	The registration process will not require more than 10 minutes. The system must be able to handle up to 2000 students registrations per day, within the registration period specified by the Educational Ministry.
Postconditions	The student is registered successfully to the university and the email and the profile is created.

Use Case

UC Name	UIS -UC-2
Summary	(Course Selection & Enrollment Process): This requirement depicts the registration of a student in the system by the university.
Dependency	UIS-US-1
Actors	Student(Freshman, Sophomores, Seniors), Finance Office, Registrar's Office, Advisor
Preconditions	<i>The student must sign the contract, pay the tuition fee, and must be the registered into the system.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Student accesses the course selection system based on academic level restrictions (Freshman, Sophomore, Senior) by clicking on “Course Selection” field. • Step 2: Registrar’s Office verifies student eligibility (contract signed, tuition paid). • Step 3: Finance Office confirms fee payment and financial approval. • Step 4: Student select the courses and click submit. • Step 5: Student confirm the selection. • Step 6: Academic Advisor gets a notification about the student selections. • Step 7: Academic Advisor approves or rejects selected courses. • Step 8: Registrar’s Office finalizes enrollment. • Step 9: System updates the student’s course list and updates timetable. • Step 10: System enables access to course syllabus. • Step 11: Student clicks on ‘Courses’. • Step 12: Student double click on course name or code. • Step 13: Student view the course syllabus.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 2: If the student has not sign the contract or has not provided all the required documentation the student is not able to select courses. • Step 3: If the student has not make the payment, the finance office wait until the payment is . If the date has expired the process, it requires payment of penalty, otherwise it still waits. • Step 4: <ul style="list-style-type: none"> ◦ The freshman must be able to select only the courses available for the respective semester. ◦ The sophomores and seniors must be able to select courses that belongs to the respective semester and the last year semester. They must first select the failed courses and then the other.
Non functional requirements	<i>The course must be selected only within the period specified on the university policies.</i>
Postconditions	<i>The student course selection is completed and students have access to course syllabus.</i>

Use Case

UC Name	UIS-UC-3
Summary	(Attendance Tracking Progress) This use case describes the process of tracking student attendance, including recording attendance, updating records, and monitoring attendance compliance.
Dependency	<i>UIS-US-1, UIS-US-2</i>
Actors	Student, Faculty Member, Academic Coordinator/Department Head, Registrar's Office
Preconditions	<i>The student must be enrolled in a course, and the university system should be active for attendance tracking.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The faculty member records each student's status as Present, Absent, or Late for the session. • Step 2: The system calculates and updates the attendance percentage for each student in real time based on the session data. • Step 3: The student accesses the system to view their attendance breakdown by course and week. • Step 4: The system generates the attendance report. • Step 5: The Academic Coordinator or Department Head accesses attendance reports to monitor compliance with university attendance policies. • Step 6: The Registrar's Office reviews attendance report. • Step 7: The Registrar's Office takes necessary actions, such as issuing warnings or other measures, for students with low attendance.
Description of the Alternative Sequence	<p>Step 3: If a student is incorrectly marked as absent, they can submit a correction request, which must be verified by the Faculty Member.</p> <p>Step 7:</p> <ul style="list-style-type: none"> ○ If a student's attendance falls below 75%, they will receive a notification via email. ○ Students with attendance below 75% will not be allowed to attend the midterm or final exams.
Non-functional Requirements	<i>The attendance system should update in real time and provide accurate reports. It must handle large-scale student data efficiently without delays.</i>
Postconditions	<i>Attendance records are updated, and students below the threshold are flagged for necessary actions. The system ensures transparency in attendance monitoring.</i>

Use Case

UC Name	UIS -UC-4
Summary	<i>(Academic Performance & Grading Process): This requirement depicts grading part of the students.</i>
Dependency	<i>UIS-US-1, UIS-US-2</i>
Actors	Student, Faculty, Registrar's Office, ICT Office
Preconditions	<i>The student must be register to the university and have already selected the courses</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Faculty enters grades for assessments (quizzes, exams, projects), by specifying name, type, weight and date and time. • Step 2: The system automatically calculates the class average. • Step 3: Faculty finalizes grades for the courses. • Step 4: System automatically calculates weighted final grades based on grading criteria. • Step 5: Registrar's Office confirms and uploads final grades. • Step 6: Student accesses final grades in both letter and numeric format. • Step 7: Weighted final grades and GPA calculations are updated accordingly. • Step 8: After final approval, grades are automatically recorded in the student's transcript. • Step 9: The student see the transcript on 'Transcript' field.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step3: <ul style="list-style-type: none"> ○ Professors have the ability to apply grade curves before finalizing results, if all grades are entered. ○ ICT Office can unlock grades for editing if corrections are needed after finalization. • Step 5: By default, students can view grades solely for their current semester courses, but they have the option to apply filters for the academic year and semester if needed.
Non functional requirements	<i>The grading system should update in real time and provide accurate reports. Weighted final grades and GPA calculations re based on the policies of the university.</i>
Postconditions	<i>The student can have access to see their grades.</i>

Use Case

UC Name	UIS -UC-5
Summary	(Document Request & Processing): This requirement describes the process of requesting, processing, and delivering official documents such as transcripts and certificates.
Dependency	UIS-UC-1
Actors	Student, Finance Office, Registrar's Office
Preconditions	The student must have an active university account. The requested document must be available in the system.
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Student click on “Document Request” field. • Step 2: Student submits a document request (e.g., transcript, certificate) through the system. • Step 3: Registrar’s Office reviews the request. • Step 4: Registrar’s Office prepare the document • Step 5: Registrar’s Office update the request status (“Active”). • Step 6: The system notifies the student when the document is ready for collection. • Step 7: Student completes the required payment at the Finance Office. • Step 8: The system provides the document with an electronic seal for authenticity. • Step 9: Student collects the document in person or downloads a digital copy if available. • Step 10: The system updates the document request status to completed.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 5: If the document is ready the Registrars Office updates the status, but if it is not the student has to wait.
Non functional requirements	<p>The processing time for document requests should not exceed 24 hours (excluding weekends and holidays).</p> <p>The system must handle at least 500 document requests per day without performance degradation.</p>
Postconditions	<p>The student successfully receives the requested document, either in physical or digital format.</p> <p>Document request status is updated completed.</p>

Use Case

UC Name	UIS -UC-6
Summary	<i>(Classroom & Learning Management): This requirement depicts the process where students enroll in courses using a code provided by the professor, to access course materials.</i>
Dependency	<i>UIS-UC-1, UIS-UC-2</i>
Actors	<i>Student, Faculty(Academic Staff)</i>
Preconditions	<i>The faculty must have created and set up the course in the system, and the course code is automatically generated.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The student enters the code (provided by professor) into the system to join the course. • Step 2: The system validates the entered code to enroll the student. • Step 3: The faculty uploads course materials in the system. • Step 4: The student accesses the uploaded materials. • Step 5: The faculty posts assignments with the specified deadline. • Step 6: The student submits assignments. • Step 7: The system checks the deadline. • Step 8: The faculty provides feedback. • Step 9: The student accesses feedback.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 2: If the student enters an invalid or expired enrollment code, the system will notify the student that the code is incorrect and he won't be able to enroll. • Step 8: If the deadline has passed, the student cannot upload his assignment and a message appears indicating that the assignment is missing.
Non functional requirements	<i>Upload and download times for materials (e.g., syllabi, assignments) should not exceed 3 seconds under normal conditions. Real-time updates shall be provided for student information.</i>
Postconditions	<i>The student is enrolled in the course and has access to all course materials and assignments.</i>

Use Case

UC Name	UIS -UC-7
Summary	Professional Practice & Career Services Process: This requirement outlines the management of student internship applications, status tracking, and company connections by the Career Office.
Dependency	<i>UIS-UC-1</i>
Actors	Student , Career Office, Company
Preconditions	<i>Student (Sophomore, Seniors) must have selected the professional practice course.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Student uploads their CV. • Step 2: Student search for internship based on the position and company. • Step 3: Student double click on the internship position and see the details. • Step 4: Student apply for a certain position by clicking on the apply button. • Step 5: Career Office reviews applications. • Step 6: Career Office evaluates student eligibility. • Step 7: Career Office connects students with companies. • Step 8: Company reviews applications. • Step 9: Application status are saved (submitted, approved, or rejected) • Step 10: Career Office maintains a company directory off internship companies and available positions.
Description of the Alternative Sequence	<p>Step 4:</p> <ul style="list-style-type: none"> ○ If the student is approved for internship, the Career Office updates the number of available positions in the selected company. <p>Step 6: If the Career Office confirms the students eligibility, it connects the student with the company, otherwise the application is rejected.</p> <p>Step 8: If the Company confirms the students application, it approves the position, otherwise the application is rejected.</p>
Non-functional requirements	<i>The system should be able to handle up to 1,000 concurrent students applying for internships.</i>
Postconditions	<i>The student application status is updated successfully.</i>

Use Case

UC Name	UIS -UC-8
Summary	<i>(Student Applies for Additional Exams): This requirement outlines the process for students to apply for additional exams.</i>
Dependency	<i>UIS-UC-1, UIS-UC-3, UIS-UC-4</i>
Actors	<i>Student, Registrar's Office, Faculty(Academic Staff)</i>
Preconditions	<i>The student must be enrolled in the course and eligible to apply for an additional exam according to university policies.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Students submit an application for an additional exam. • Step 2: The system forwards the application to the Registrar's Office for review. • Step 3: The Registrar's Office verifies eligibility and request validity. • Step 4: If approved, the system notifies the student. • Step 5: Faculty makes the exam. • Step 6: The Faculty records the result of the exam. • Step 7: The system upgrades the grade.
Description of the Alternative Sequence	<i>Step 4: If the student's application does not meet the university's policies or eligibility criteria, the Registrar's Office rejects the request. The system notifies the student of the rejection.</i>
Non functional requirements	<p><i>The system must process and forward an additional exam application within 5 seconds after submission.</i></p> <p><i>The Registrar's Office should be able to approve or reject applications within 2 business days.</i></p> <p><i>The system should support up to 500 concurrent exam applications without performance degradation.</i></p>
Postconditions	<i>The student's grade for the additional exam has been successfully recorded in the system and reflected in their transcript.</i>

Use Case

UC Name	UIS -UC-9
Summary	<i>(Timetable Management Process): This requirement depicts the process of creating and managing the university timetable.</i>
Dependency	<i>UIS-UC-1, UIS-UC-2</i>
Actors	Students, Head of Department, Registrar's Office, Faculty Members,
Preconditions	<i>Faculty availability, course requirements, and classroom data must be available to the Head of Department.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Head of Department sees and verifies data related to courses, faculty availability, and classroom capacity. • Step 2: He creates the initial timetable based on collected data. • Step 3: Faculty members review and propose adjustments if necessary. • If adjustments are needed Head of department makes changes. • Step 4: Head of Department finalizes the timetable and submits it to the Registrar's Office for approval. • Step 5: Registrar's Office reviews the timetable. • Step 6: Registrar's Office approves the timetable. • Step 7: System publishes the finalized timetable to students and faculty members through the portal. • Step 8: System sends automated notifications to all relevant users.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 6: Registrar's Office may request changes or reject the timetable. In case of rejection, the Head of Department revises and resubmits the timetable.
Non functional requirements	<i>The timetable creation and publishing process should not take more than 30 minutes. The system must support up to 100 timetable changes per semester.</i>
Postconditions	<i>The finalized timetable is successfully published and accessible to students and faculty members.</i>

Use Case

UC Name	UIS -UC-10
Summary	<i>(Degree Audit Process): This requirement depicts the process of verifying a student's academic progress towards graduation.</i>
Dependency	<i>UIS-UC-1</i>
Actors	<i>Seniors Student, Registrar's Office, System</i>
Preconditions	<i>The student's academic records must be available and up-to-date in the system.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Registrar's Office retrieves student academic records. • Step 2: System analyzes completed courses, earned credits, and remaining requirements. • Step 3: System generates a degree audit report, displaying progress toward graduation. • Step 4: Registrar's Office verifies if the student meets graduation eligibility criteria. • Step 5: System highlights missing courses or credits if requirements are unmet. • Step 6: Student receives notifications regarding degree progress and remaining coursework. • Step 7: Registrar's Office updates the audit status once graduation requirements are fulfilled.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 4: If graduation eligibility criteria are not met, the system sends a notification of missing requirements to the student and the audit status remains pending.
Non functional requirements	-The degree audit process should not exceed 3 minutes per student. -The system must support up to 1500 degree audit processes per day during peak periods.
Postconditions	<i>A degree audit report is generated, and the student is notified of their progress. The audit status is updated based on the fulfillment of graduation requirements.</i>

Use Case

UC Name	ThinkLink-UC-1
Summary	<i>(Class Creation & University Approval): This requirement describes how a content provider creates a new class and seeks university approval.</i>
Dependency	<i>No dependencies</i>
Actors	Content Provider, University Representative
Preconditions	<i>The content provider must have the necessary permissions to create a class.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The content provider clicks on 'Create Class' button. • Step 2: The content provider creates a new class and specifies the university. • Step 3: Submit class creation request. • Step 4: The system generates a notification to the university representative about the new class request. • Step 5: The university representative reviews the request • Step 6: The university representatives either approves or rejects the request. • Step 7: If approved, the class is added to the university's list of official courses. • Step 8: The system notifies the content provider of the decision. • Step 9: The content provider receives the decision notification.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 3: If the university rejects the request, the system notifies the content provider with feedback for potential resubmission.
Non functional requirements	<i>The university should process class approval within 48 hours. The system should notify users of approval/rejection within 2 sec after processing.</i>
Postconditions	<i>If approved, the class is available for students to enroll in. If rejected, the content provider can review the feedback and resubmit the request.</i>

Use Case

UC Name	ThinkLink-UC-2
Summary	<i>(Class Enrollment & Access Process): This requirement describes the process of students enrolling in classes and gaining access to course materials.</i>
Dependency	<i>ThinkLink-UC-1</i>
Actors	Student
Preconditions	<i>The student must have an active university profile and be logged into the system. The classes must be created.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Click the 'Classes' field. • Step 2: The system displays available and enrolled classes for students. • Step 3: A student chooses a class. • Step 4: The system grants access to class materials of selected class. • Step 5: The student click on "Enroll" button. • Step 6: The system updates the student's enrollment status. • Step 7: The system allow access to interactive features. • Step 8: The student can participate in interactive features such as tests and seminars.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 6: If the class has reached maximum capacity, the system displays a notification, and enrollment is not processed. • Step 7: If the student is not enrolled in the class it can only see the course materials but not participate on interactive features.
Non functional requirements	<i>The system should process an enrollment request in under 2 seconds. The system must support up to 500 concurrent enrollments at a given time.</i>
Postconditions	<i>The student is successfully enrolled in the selected class and has access to all permitted materials and activities.</i>

Use Case

UC Name	ThinkLink-UC-3
Summary	<i>(Test & Seminar Participation): This requirement covers student participation in tests and seminars.</i>
Dependency	<i>ThinkLink-UC-1, ThinkLink-UC-2</i>
Actors	Student, Content Provider
Preconditions	<i>A test or seminar must be scheduled, and students must be enrolled in the class.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The content provider creates a test (with different types of questions) or schedules a seminar. • Step 2: The system automatically notifies enrolled students about the test or seminar. • Step 3: Students log in and participate at the scheduled time. • Step 4: The system records test responses and seminar attendance, after each completion. • Step 5: The content provider reviews participation data and test results. • Step 6: Students receive feedback on their performance.
Description of the Alternative Sequence	<p>Step 1: If for any reason the test or seminar will not be held, It can be cancelled with a specified reason, and the student will get an notification.</p> <p>Step 3:</p> <ul style="list-style-type: none"> ○ If a student misses the test/seminar, the system marks them as absent. ○ If the student participates on a test, he may select to attend the test in different format: multiple choice questions, open questions, true or false, or he may want to combine them.
Non functional requirements	<i>The system should support at least 1000 simultaneous test participants. Test results should be available to students within 24 hours of submission.</i>
Postconditions	<i>The test results and seminar participation records are stored, and students receive feedback.</i>

Use Case

UC Name	ThinkLink -UC-4
Summary	(Seminars Process): This requirement depicts the creation, management, participation, and recording of seminars organized by students and institutions.
Dependency	No dependencies
Actors	Student, Content Providers, System
Preconditions	<i>Students and institutions must have valid accounts and appropriate permissions to create or register for seminars.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Content Providers click on the “Create Seminar” button. • Step 2: Content Providers manage seminars, entering details such as topic, speaker(s), date, time, and delivery mode. • Step 3: Content Providers submit the seminar and can edit the seminar details if needed. • Step 4: Students register for seminars • Step 5: Student receive automated reminders via email or in-app notifications. • Step 6: Student engages with features such as live chat, Q&A sessions, and polls to enhance engagement. • Step 7: The system records the seminars. • Step 8: The system stores recorded seminars. • Step 9: Student click on ‘Past Seminars’ menu. • Step 10: Students can have access on the seminar materials.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 6: If interactive features are disabled due to technical issues, seminars proceed in lecture-only mode, and the session is still recorded.
Non functional requirements	<p>-The system should support at least 300 concurrent seminar participants.</p> <p>-Reminders must be sent at least 24 hours and 1 hour before the seminar.</p> <p>-Recordings must be available within 1 hour after the seminar ends.</p>
Postconditions	<i>The seminar is successfully created and managed, students are notified, and the seminar recording is stored and available for future access.</i>

Use Case

UC Name	ThinkLink-UC-5
Summary	(Simulations and Video Explanations Process): This requirement outlines the use of interactive simulations and video explanations to enhance student learning through a virtual environment.
Dependency	<i>ThinkLink-UC-1, ThinkLink-UC-2</i>
Actors	<i>Student, System, Content providers</i>
Preconditions	Students must have access to the platform and a registered account to interact with simulations and videos.
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The Content Provider assigns specific simulations relevant to the class curriculum and curated video lessons aligned with learning objectives to be accessed by students. • Step 2: Student search the topic of the interest. • Step 3: System provides video explanations for key topics, created by subject-matter experts. • Step 4: Student watches these videos for deeper understanding. • Step 5: Student engage with simulations through pausing, rewinding, and taking notes within the video interface for better comprehension.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 2: <ul style="list-style-type: none"> ○ Students explore new topics or select the simulations and video explanations, recommended by the system, based on students' learning progress by analyzing their past interactions, quiz results, frequently accessed topics, and areas where they need improvement. ○ Student reviews past simulations and video explanations to reinforce learning without engaging in new recommendations.
Non-functional requirements	The system should be able to support real-time interactions within simulations for up to 5,000 concurrent users.
Postconditions	<i>The student progress is updated</i>

Use Case

UC Name	ThinkLink-UC-6
Summary	(Practice Tests and Quizzes): This requirement describes the process of students taking practice tests and quizzes, receiving feedback, and analyzing their performance, as well as the role of Content Providers in creating and managing tests.
Dependency	No dependencies
Actors	Student, Content Provider
Preconditions	The students must have been signed in the system to have access.
Description of the Main Sequence	<ul style="list-style-type: none"> ● Step 1: Content Provider clicks the "Create Test" button. ● Step 2: Content Provider designs multiple questions. ● Step 3: Content Provider uploads the test to the system with a specified name. ● Step 4: Student selects a practice test and chooses between timed or untimed mode. ● Step 5: The system presents various question types, including multiple-choice, short answer, and essay-style questions. ● Step 6: The system provides auto-grading for objective questions. ● Step 7: The system generates performance reports and analytics, highlighting the student's strengths and weaknesses. ● Step 8: The system delivers instant feedback on performance. ● Step 9: Student reviews detailed explanations for correct answers and can revisit past exam attempts.
Description of the Alternative Sequence	N/A (The process is continuous and allows updates anytime.)
Non functional requirements	<p>The system must provide instant feedback for all auto-gradable questions within 5 seconds after submission.</p> <p>The system should support at least 10,000 simultaneous test attempts without performance issues.</p> <p>Performance reports should be generated within 5 seconds after test completion.</p>
Postconditions	<p>The student successfully completes the test and receives performance insights.</p> <p>The system stores test attempts for future review and tracking.</p>

Use Case

UC Name	ThinkLink-UC-7
Summary	<i>(Create, Answer, and Interact with Posts): This requirement depicts the process of creating, answering, and interacting with posts on the ThinkLink platform.</i>
Dependency	<i>No dependencies</i>
Actors	User (Student or Academic Staff), System
Preconditions	<i>The user must be logged into the system with an active profile.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: User clicks on the "Create New Post" button. • Step 2: User fills in the necessary data for the post. • Step 3: User submits the post. • Step 4: The system displays the post in the relevant category. • Step 5: Other users view the post. • Step 6: Other users decide whether they want to submit an answer or comment. • Step 7: Other users decide whether they want to vote on the post or responses. • Step 8: The original poster can mark a response as the "Best Answer." • Step 9: The system sends notifications for responses, comments, or mentions.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 3: If the post format is incorrect or missing required fields, the system prompts the user to complete the necessary information
Non functional requirements	<i>Post creation and interaction processes should not exceed 3 seconds. The system must handle up to 100,000 interactions per day.</i>
Postconditions	<i>The post is successfully created, and users are notified of interactions and responses.</i>

Use Case

UC Name	ThinkLink -UC-8
Summary	<i>(Content Moderation and Management): This requirement depicts the process of flagging and managing inappropriate or spam content on the ThinkLink platform.</i>
Dependency	<i>No dependencies</i>
Actors	Student, Content Provider, Academic Staff, System **Moderators can be either Content Providers or Academic Staff
Preconditions	<i>The system must have moderation tools and guideline policies in place.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: User flags inappropriate, spam, or off-topic content. • Step 2: System notifies moderators of the flagged content. • Step 3: Moderators review the flagged content. • Step 4: Moderators verify whether the content violates guidelines. • Step 5: Moderators can edit, hide, or remove the content. • Step 6: Content Providers and Academic Staff can also edit or delete inappropriate posts. • Step 7: System logs all moderation actions for auditing.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 4: If the content does not violate guidelines, the moderator dismisses the flag and restores the content's visibility.
Non functional requirements	<i>Moderation actions should be performed within 5 minutes of flagging. The system should support up to 5,000 moderation actions per day.</i>
Postconditions	<i>The content is either approved, edited, hidden, or removed, and the action is logged.</i>

Use Case

UC Name	ThinkLink-UC-9
Summary	(Search and Discover Content Process) This requirement outlines how users can search for and discover relevant questions, answers, and discussions using the platform.
Dependency	<i>No dependencies</i>
Actors	<i>Users, System</i>
Preconditions	Users must have access to the platform
Description of the Main Sequence	<ul style="list-style-type: none">• Step 1: User enters keywords or phrases into the search bar• Step 2: System retrieves relevant questions, answers, and discussions, based on the keyword.• Step 3: User browses the results• Step 4: Users selects the most relevant content
Description of the Alternative Sequence	<ul style="list-style-type: none">• Step 1: If the search results are not satisfactory, the user can enter a different keyword or phrase.
Non-functional requirements	The system should deliver search results within 2 seconds for optimal user experience.
Postconditions	User successfully finds relevant content, refines the search, or explores alternative recommendations.

Use Case

UC Name	ThinkLink -UC-10
Summary	<i>(Set Up and Customize Pomodoro Timer): This requirement depicts the process of configuring and using the Pomodoro Timer for efficient time management.</i>
Dependency	<i>No dependencies</i>
Actors	<i>User, System</i>
Preconditions	<i>The user must be logged into the system and have access to the Pomodoro Timer feature.</i>
Description of the Main Sequence	<p>Step 1: User navigates to the Pomodoro Timer feature.</p> <p>Step 2: User configures settings, including work session length, break duration, and cycle count.</p> <p>Step 3: User starts the timer.</p> <p>Step 4: The system begins tracking the session.</p> <p>Step 5: The system checks when the work session ends.</p> <p>Step 6: The system tracks the break duration and notifies the user when the break ends.</p> <p>Step 7: If the Pomodoro cycle is complete, tracking stops. Otherwise, the system continues.</p> <p>Step 8: The system tracks completed cycles and total time spent.</p>
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 2: If the user does not customize settings, the system uses default values (e.g., 25 minutes work, 5 minutes break). • Step 4: If the user chooses to stop, the system stops tracking. • Step 5: The system checks if it's break time and notifies the user.
Non functional requirements	<i>The timer should have high accuracy with less than a 1-second delay. Notifications should be prompt and non-intrusive.</i>
Postconditions	<i>The Pomodoro Timer runs as configured and notifies the user at the end of each session.</i>

Use Case

UC Name	ThinkLink -UC-11
Summary	<i>(Task Management and Progress Tracking): This requirement depicts the process of creating, managing, and tracking tasks during Pomodoro sessions.</i>
Dependency	<i>No dependencies</i>
Actors	User (Student or Academic Staff), System
Preconditions	<i>The user must be logged into the system and have access to the task management feature.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: User creates a list of tasks to complete during sessions. • Step 2: User edits or deletes tasks as needed. • Step 3: System tracks completed tasks • Step 4: System displays progress on the dashboard. • Step 5: Notifications remind users to start new sessions if inactive
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 2: If the user attempts to edit a non-existent task, the system notifies them of the error.
Non functional requirements	<i>Task creation, editing, and deletion should be performed within 2 seconds. The system should track up to 100 tasks simultaneously.</i>
Postconditions	<i>The list of tasks is updated and progress is accurately tracked.</i>

Use Case

UC Name	ThinkLink-UC-12
Summary	<i>(Flashcard Creation & Management): This use case describes the process of creating, organizing, and managing flashcards with text, images, or mathematical formulas.</i>
Dependency	No dependencies
Actors	Content Provider
Preconditions	The content provider must be logged into the system.
Description of the Main Sequence	<ul style="list-style-type: none"> Step 1: The content provider clicks on “Create Flashcard” button. Step 2: The content provider creates flashcards by adding text, images. Step 3: The content provider then categorizes the flashcard, specify its category. Step 4: The content provider clicks the submit button. Step 5: The system saves the flashcards and shows it in the relevant category. Step 6: The content provider can edit, update, or delete flashcards as needed.
Description of the Alternative Sequence	Step 2: If invalid content is added (e.g., unsupported file type, inappropriate material, already existing content), the system notifies the content provider and prevents saving.
Non-functional Requirements	The system should support various formats (text, images, formulas) and allow smooth editing and categorization.
Postconditions	Flashcards are successfully created, organized into decks, and available for use.

Use Case

UC Name	ThinkLink-UC-13
Summary	<i>(Flashcard Access & Study Modes) This use case describes how students can access flashcards and choose different study modes for effective learning.</i>
Dependency	No dependencies
Actors	Student
Preconditions	<i>Flashcard decks must be available in the system. The student must have access to the flashcard feature.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: The student browses or searches for flashcard decks using keywords, tags, or subjects. • Step 2: The system displays available flashcards based on the search. • Step 3: The student selects a study mode: <ul style="list-style-type: none"> ◦ Standard Mode – Flip front and back of cards. ◦ Quiz Mode – Multiple-choice or fill-in-the-blank. ◦ Spaced Repetition Mode – Adaptive review based on performance. • Step 4: The student can shuffle cards for randomized practice. • Step 5: The student can begin studying through the flashcards
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 1: If no matching flashcards are found, the system suggests related decks based on the student's search history or preferences. • Step 4: If the student wants a different study experience, they can switch between study modes at any time.
Non-functional Requirements	<i>The system should provide fast search functionality and support seamless transitions between study modes.</i>
Postconditions	<i>The student successfully accesses and studies flashcards in the chosen mode.</i>

Use Case

UC Name	ThinkLink-UC-14
Summary	(Search, Tracking & Gamification): This use case describes how students can search for flashcards, track their progress, and engage in gamified learning with points, badges, and challenges.
Dependency	ThinkLink-UC-13
Actors	Student
Preconditions	The student must have an active account and previously studied flashcards for spaced repetition tracking.
Description of the Main Sequence	<ul style="list-style-type: none">• Step 1: After the student has accessed the flash cards and has begun studying through them the system tracks the progress and provides mastery analytics.• Step 2: Students earn points and badges for completing revision tasks.• Step 3: Students can participate in weekly/monthly challenges where they compete on quiz scores or streaks to earn additional rewards.
Description of the Alternative Sequence	<ul style="list-style-type: none">• Step 2: If the student is not performing well, the system uses the Spaced Repetition algorithm to suggest flashcards that need revision based on past performance.
Non-functional Requirements	The system should provide fast and accurate search results, real-time tracking, and smooth gamification elements without performance issues.
Postconditions	The student successfully revises flashcards, tracks their progress, and engages in challenges to enhance learning motivation.

Use Case

UC Name	ThinkLink-UC-15
Summary	<i>(Job and Internship Listings)</i> This use case describes how company representatives post job and internship listings and how students search for relevant opportunities.
Dependency	No dependencies
Actors	Company Representative, Student
Preconditions	The company representative must have an authorized account to post listings.
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: A company representative clicks on “Create Post” button. • Step 2: A company representative posts job and internship listings on the platform, providing details like company name, role description, and application deadlines. • Step 3: The company representative enters details based on the position type. For internship listings: internship type (paid, unpaid). For job positions: Job type (full-time, part-time, remote). • Step 4: The company representative categorizes listings by industry and location. • Step 4: Students search using filters (industry, location, job type) • Step 5: The system displays filtered results.
Description of the Alternative Sequence	N/A (The process is continuous and allows updates anytime.)
Non-functional Requirements	The system should support an intuitive search and filtering mechanism, ensuring quick and accurate results. It must handle a large number of listings efficiently.
Postconditions	Job and internship listings are successfully posted, categorized, and searchable by students.

Use Case

UC Name	ThinkLink -UC-16
Summary	<i>(Profile Creation & Customization): This requirement depicts the creation and customization of a student's career profile in the system.</i>
Dependency	No dependencies
Actors	Student, Company Representatives, System
Preconditions	<i>The student must have a valid university account and access to the system.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Student click on “Create Profile” button. • Step 2: Student creates the career profile by entering details about their education, skills, and work experience. • Step 3: Student clicks on submit button. • Step 4: The student can edit their profile at any time to update relevant information. • Step 5: The company representative search the name of the student. • Step 6: The company representatives double click on the student profile and see their data. • Step 7: The student receive notification for each profile view and search.
Description of the Alternative Sequence	N/A (<i>The process is continuous and allows updates anytime.</i>)
Non functional requirements	<ul style="list-style-type: none"> -The profile creation process should not exceed 5 minutes. -The system must allow seamless updates with real-time data validation and user-friendly input forms.
Postconditions	<i>A student's career profile is successfully created and stored in the system, with the option to update it as needed.</i>

Use Case

UC Name	ThinkLink-UC-17
Summary	<i>(Search & Application Process) This use case describes how students search for job or internship opportunities and apply, while companies manage applications and update statuses.</i>
Dependency	<i>No dependencies</i>
Actors	Student, Company Representative
Preconditions	<i>Job and internship listings must be available in the system. The student must have an account to apply.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: A student searches for internships or job opportunities using keywords, location, job type, or experience level. • Step 2: The student selects a job or internship by double clicking on the job or internship post. • Step 3: Student applies directly by clicking on 'Apply' button • Step 4: Student fulfill necessary information and attach relevant documents (e.g., resume, cover letter). • Step 5: Student click on 'Submit' button. • Step 6: The company representatives shortlist candidates, contact them for interviews, or reject applications. • Step 7: The system updates the application status (e.g., shortlisted, interview scheduled, rejected) • Step 8: The system notifies students accordingly. • Step 9: Student receives notification.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 5: If the company representatives confirms the students application, it contacts the student, otherwise the application is rejected.
Non-functional Requirements	<i>The system should provide a fast and accurate search experience, support secure document uploads, and deliver real-time status updates and notifications.</i>
Postconditions	<i>The student's application is submitted successfully, and the company representative can manage the application process effectively.</i>

Use Case

UC Name	ThinkLink -UC-18
Summary	(Virtual Career Fairs & Events): This requirement describes the process of organizing and participating in virtual career fairs and webinars, allowing students to explore job opportunities and interact with company representatives.
Dependency	No dependencies
Actors	Student, Company Representative
Preconditions	The students must have been signed in the system to have access.
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Company representative creates a virtual career fair or webinar with event details. • Step 2: Company representatives publishes the event by clicking on “Public” button. • Step 3: The system sends a notification to students. • Step 4: Students register for the event. • Step 5: Students join the virtual event at the scheduled time. • Step 6: Company representative presents job opportunities and career insights. • Step 7: Students participate in Q&A sessions and network with company representatives.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 3: If the student does not register on the virtual career fair he will get notified again one day before the virtual career fair or webinar.
Non functional requirements	<p>The system must support at least 1,000 simultaneous attendees in a single virtual career fair.</p> <p>Event notifications must be sent at least 24 hours and 1 hour before the event starts.</p> <p>The platform should ensure high-quality streaming and interactive features (live Q&A, polls, and chat).</p>
Postconditions	Students gain insights into job opportunities and career options. Company representatives can connect with potential candidates and receive student inquiries.

Use Case

UC Name	ThinkLink -UC-19
Summary	<i>(Past Papers Process): This requirement depicts how students interact with the system to upload, search, and manage past papers, while administrators moderate the content.</i>
Dependency	<i>No dependencies</i>
Actors	<i>Student, Administrator, System</i>
Preconditions	<i>The student must be logged into the system with a valid university account.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • Step 1: Student clicks on the “Upload Past Paper” on the left of screen. • Step 2: Student uploads past exam papers, quizzes, and assignments • Step 3: Student categorizes the past papers by university, course, subject, and academic year. • Step 4: Student filters past papers by university, courses, subject, and academic year. • Step 5: Student preview past papers by double clicking on the the past paper. • Step 6: Student downloads the past papers if wanted. • Step 7: Student rates, reviews, and provides feedback on past papers to ensure quality and relevance. • Step 8: Administrator uses moderation tools to review and remove content that violates guidelines or is of low quality. • Step 9: System stores uploaded content and provides preview, filtering, download and rating functionalities.
Description of the Alternative Sequence	<ul style="list-style-type: none"> • Step 8: If flagged content is found, the system notifies the administrator about it and the administrator removes the uploaded past papers.
Non functional requirements	<p>-The system should handle up to 500 simultaneous uploads and 1000 searches per hour.</p> <p>-The upload process should not exceed 3 minutes and must support multiple file formats (PDF, DOCX).</p>
Postconditions	<i>The past papers are available in the system’s database, categorized and searchable, with moderation to ensure quality.</i>

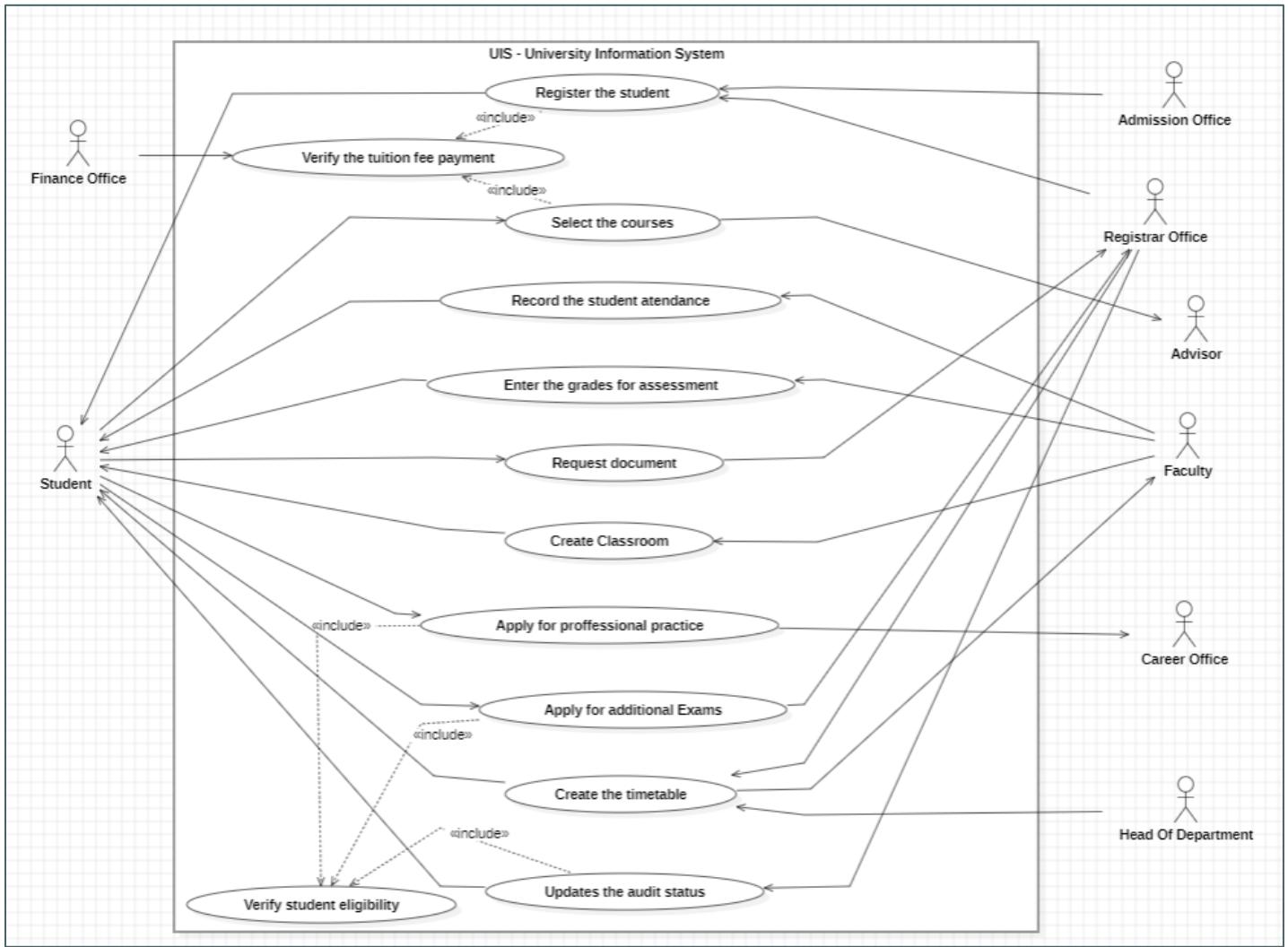
Use Case

UC Name	<i>ThinkLink -UC-20</i>
Summary	<i>(Textbooks): This requirement depicts a system where students can search, download, and customize textbooks, while content providers upload and manage materials.</i>
Dependency	<i>ThinkLink-UC-1</i>
Actors	<i>Student, Content Providers</i>
Preconditions	<i>The student is logged into the system where textbooks are categorized by topic and course.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • <i>Step 1: The content provider uploads the textbook material(specify title and course)</i> • <i>Step 2: The student selects a textbook by category and title.</i> • <i>Step 3: The system checks if textbooks are available.</i> • <i>Step 4: The student selects one for more details.</i> • <i>Step 5: The student downloads the textbook in their preferred format</i> • <i>Step 6: The system opens it in the integrated reader.</i> • <i>Step 7: Student interacts with the textbook highlight text, create bookmarks for easy reference)</i>
Description of the Alternative Sequence	<ul style="list-style-type: none"> • <i>Step 3: If no textbooks are found in the selected category, the system informs the student that no textbooks are available.</i>
Non functional requirements	<i>The system must support up to 10,000 active users at any given time without delays, crashes, or degraded performance.</i>
Postconditions	<i>The user has successfully downloaded or accessed the selected textbook, customized the reading and is able to interact with the textbook through highlighting and bookmarks.</i>

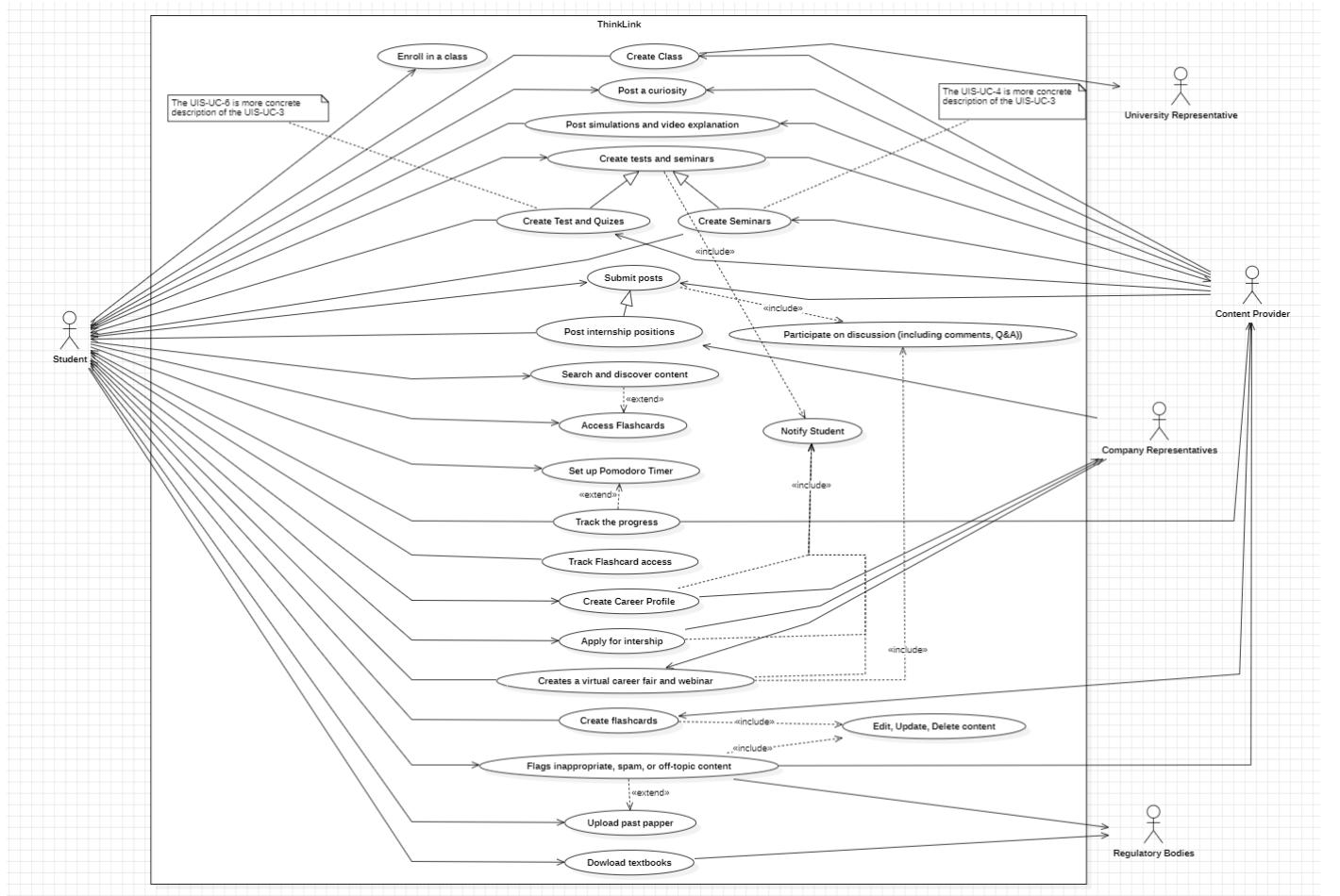
Use Case

UC Name	ThinkLink -UC-21
Summary	<i>(Curiosities): This requirement depicts a system that allows students to share, discover, engage with, and interact with educational content, promoting learning, discussions, and personal exploration across different subjects.</i>
Dependency	<i>ThinkLink-UC-1, ThinkLink-UC-8, ThinkLink-UC-9</i>
Actors	<i>Student, Administrator</i>
Preconditions	<i>The student is logged into the platform and has access to the main dashboard where they can search, submit, and interact with curiosities.</i>
Description of the Main Sequence	<ul style="list-style-type: none"> • <i>Step 1: Student uploads a curiosity.</i> • <i>Step 2: Administrator reviews, validates and removes content that violates guidelines.</i> • <i>Step 3: User selects a category of interest.</i> • <i>Step 4: System checks if curiosities exist in selected category.</i> • <i>Step 5: The system displays related curiosities.</i> • <i>Step 6: The user clicks on a curiosity to view its full details</i> • <i>Step 7: The user engages with the curiosity (like, comment, share).</i> • <i>Step 8: The user bookmarks the curiosity for future reference.</i>
Description of the Alternative Sequence	<ul style="list-style-type: none"> • <i>Step 2: If flagged content is found, the administrator removes it.</i> • <i>Step 4: If no curiosities are found in the selected category or topic, the system notifies the user with a message stating that no content is available in that category and offers suggestions to explore other categories.</i>
Non functional requirements	<i>The system must support up to 10,000 active users at any given time without delays, crashes, or degraded performance.</i>
Postconditions	<i>The user has successfully interacted with the system, having either engaged with curiosities, submitted a new curiosity, or explored different categories and topics, with all actions and preferences recorded in their account for future reference.</i>

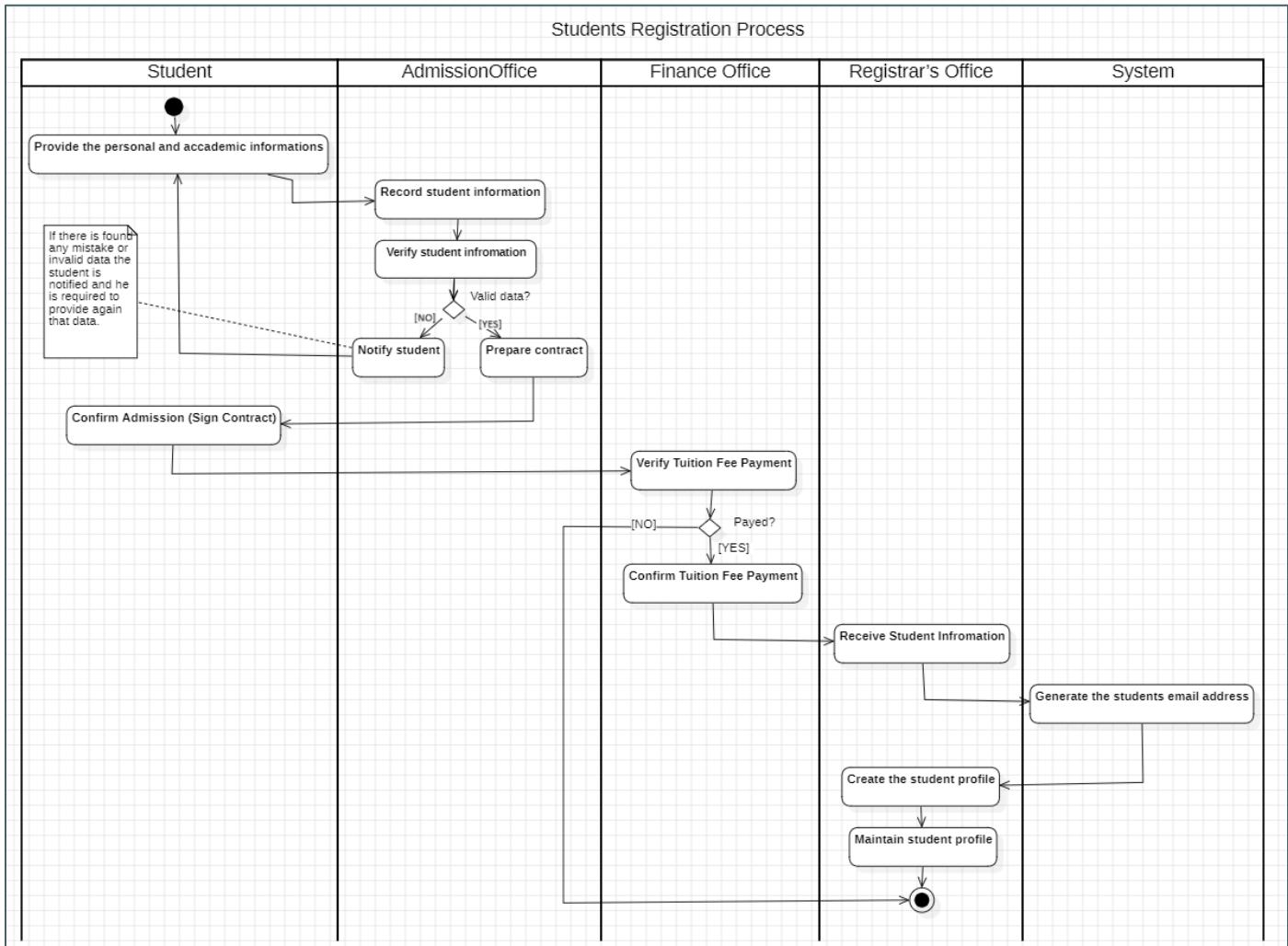
UIS – Use Case diagram



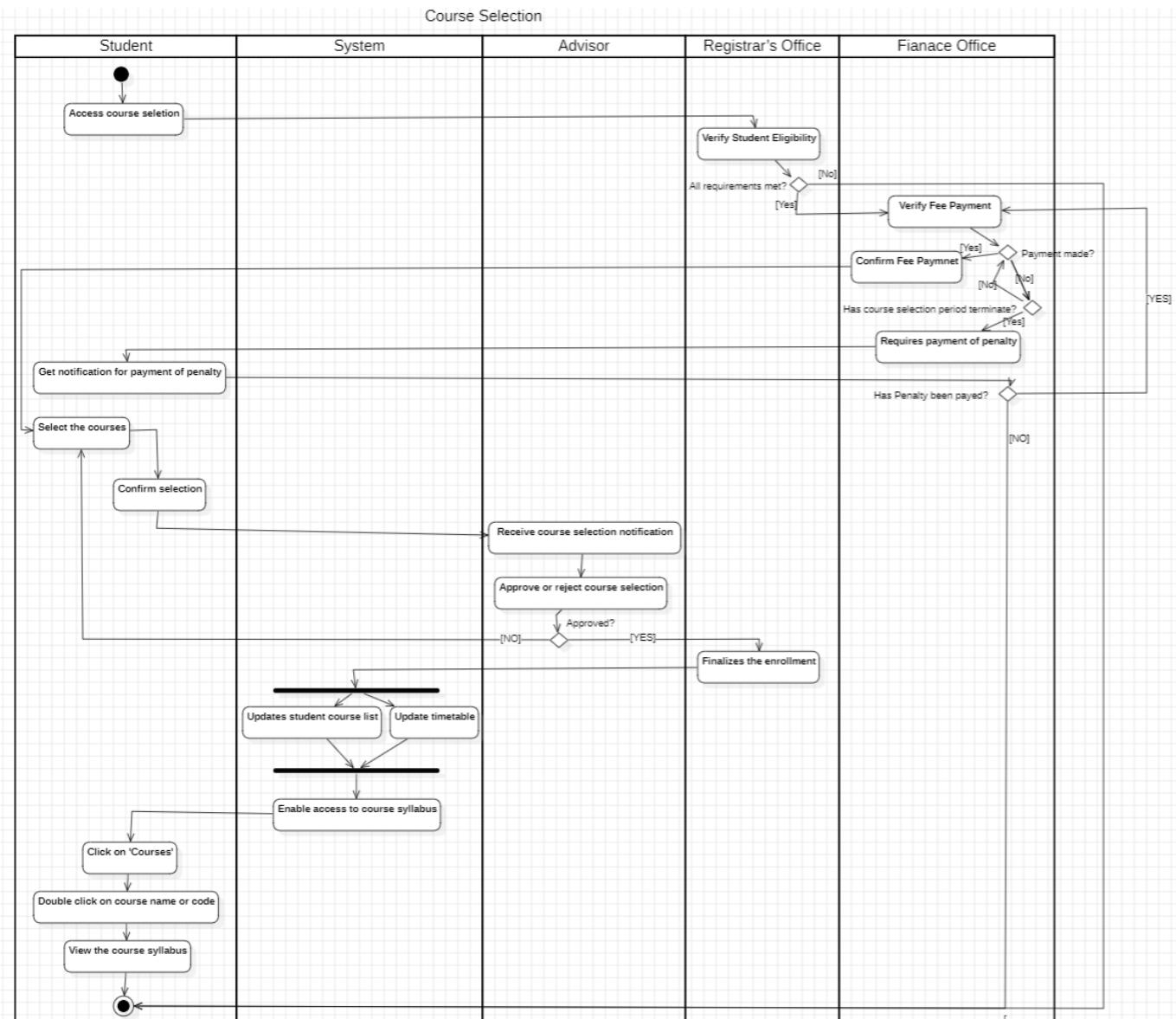
ThinkLink – Use Case diagram



Activity Diagram – UIS-AD-1

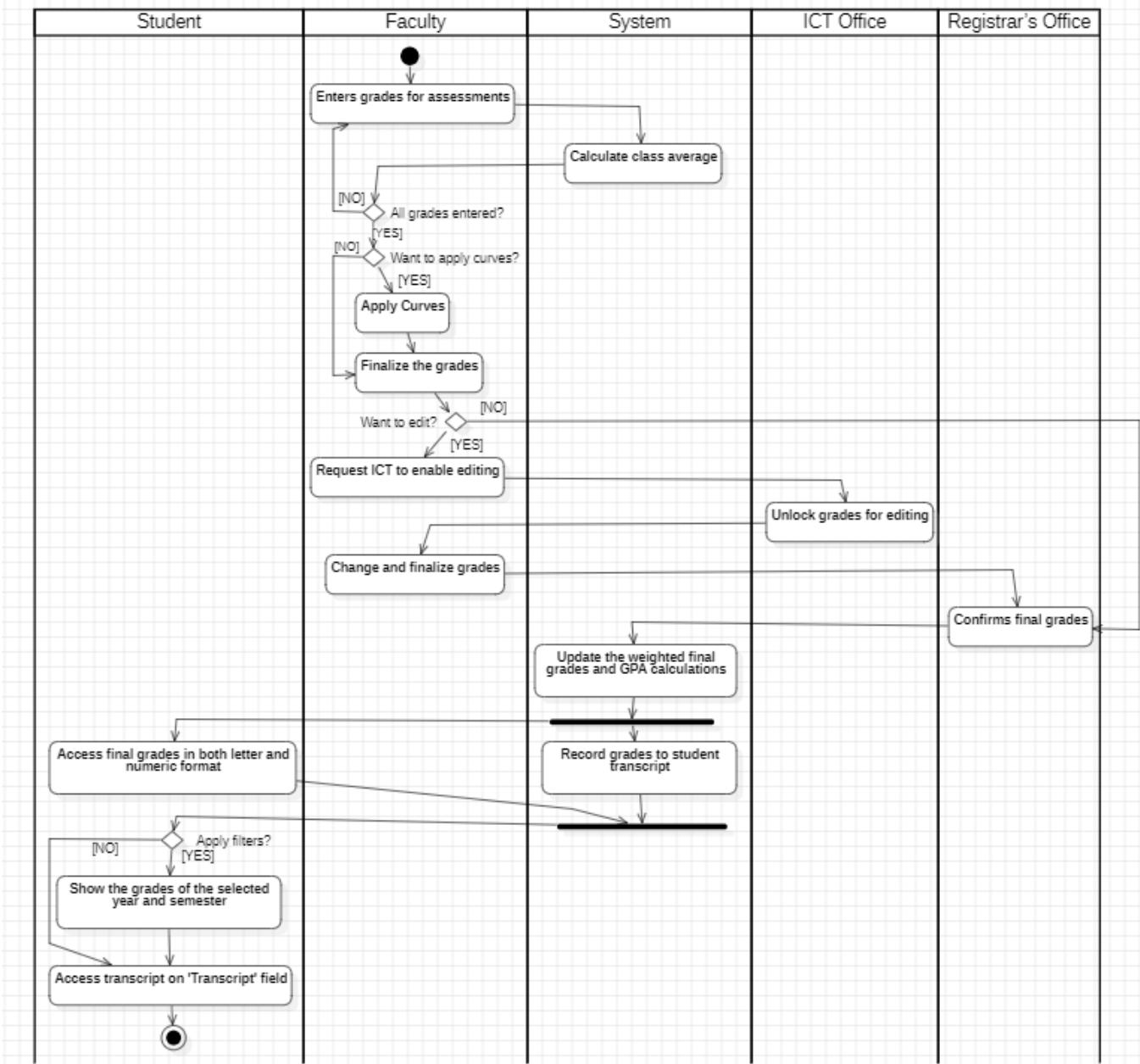


Activity Diagram – UIS-AD-2

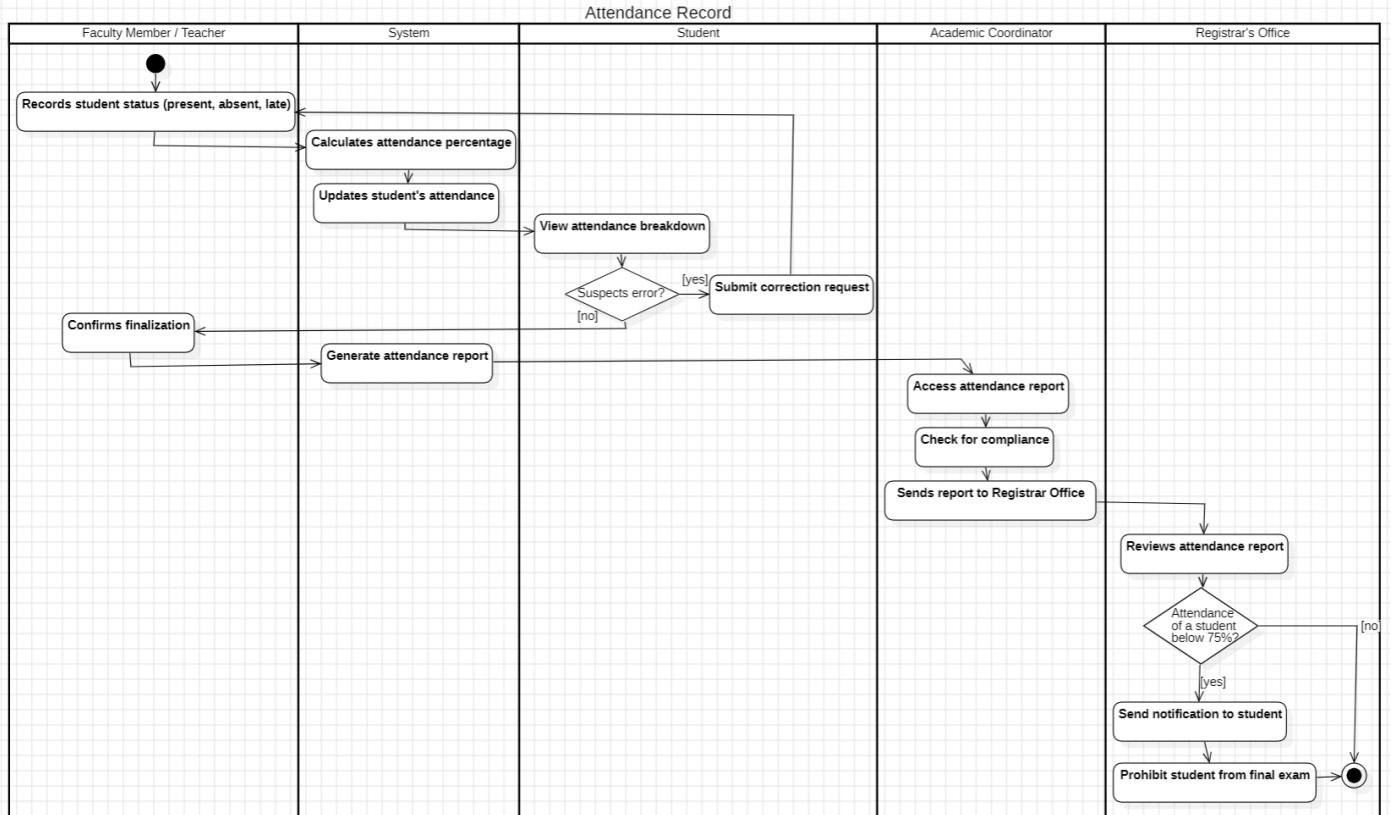


Activity Diagram – UIS-AD-3

Academic Performance & Grading Process

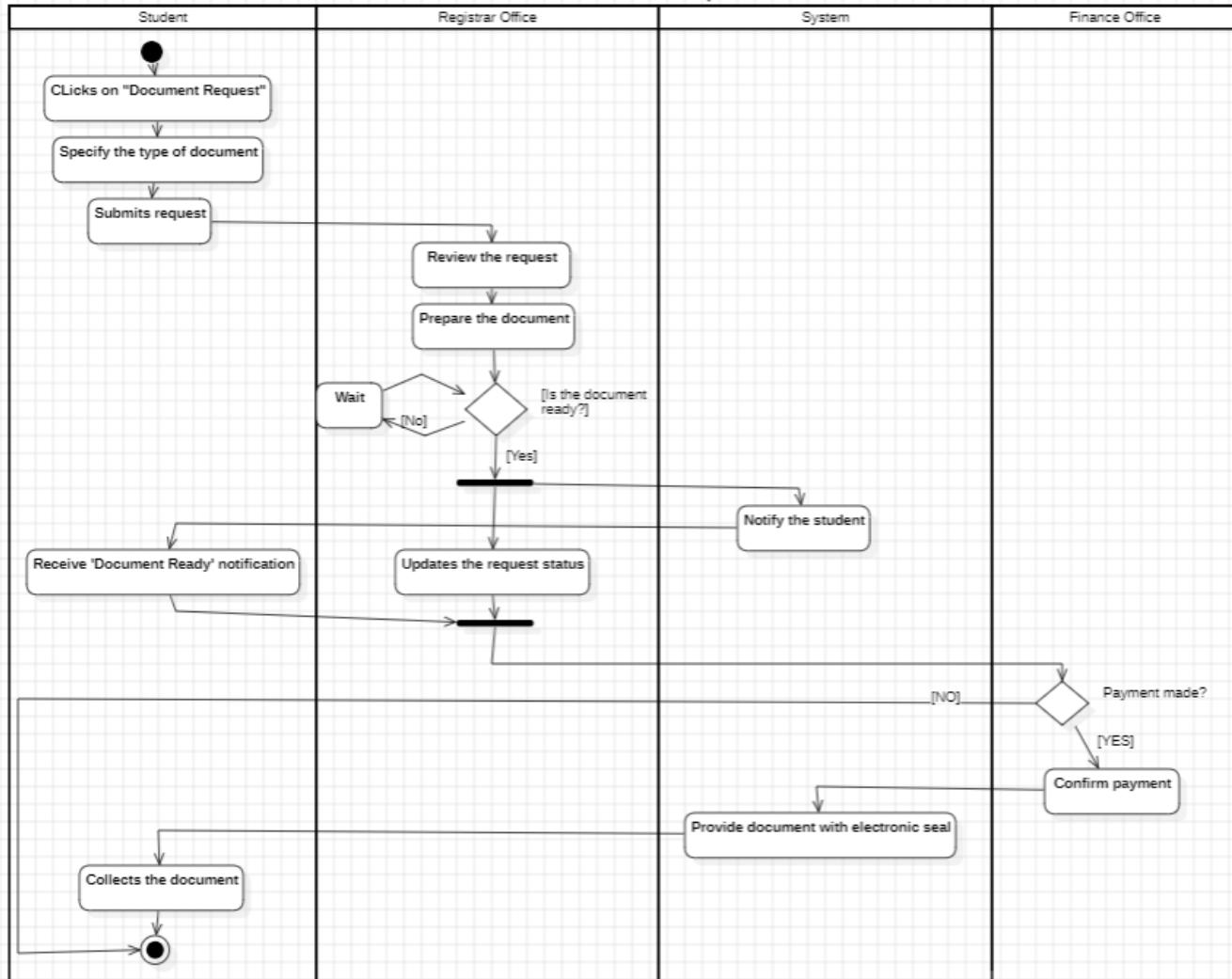


Activity Diagram – UIS-AD-4



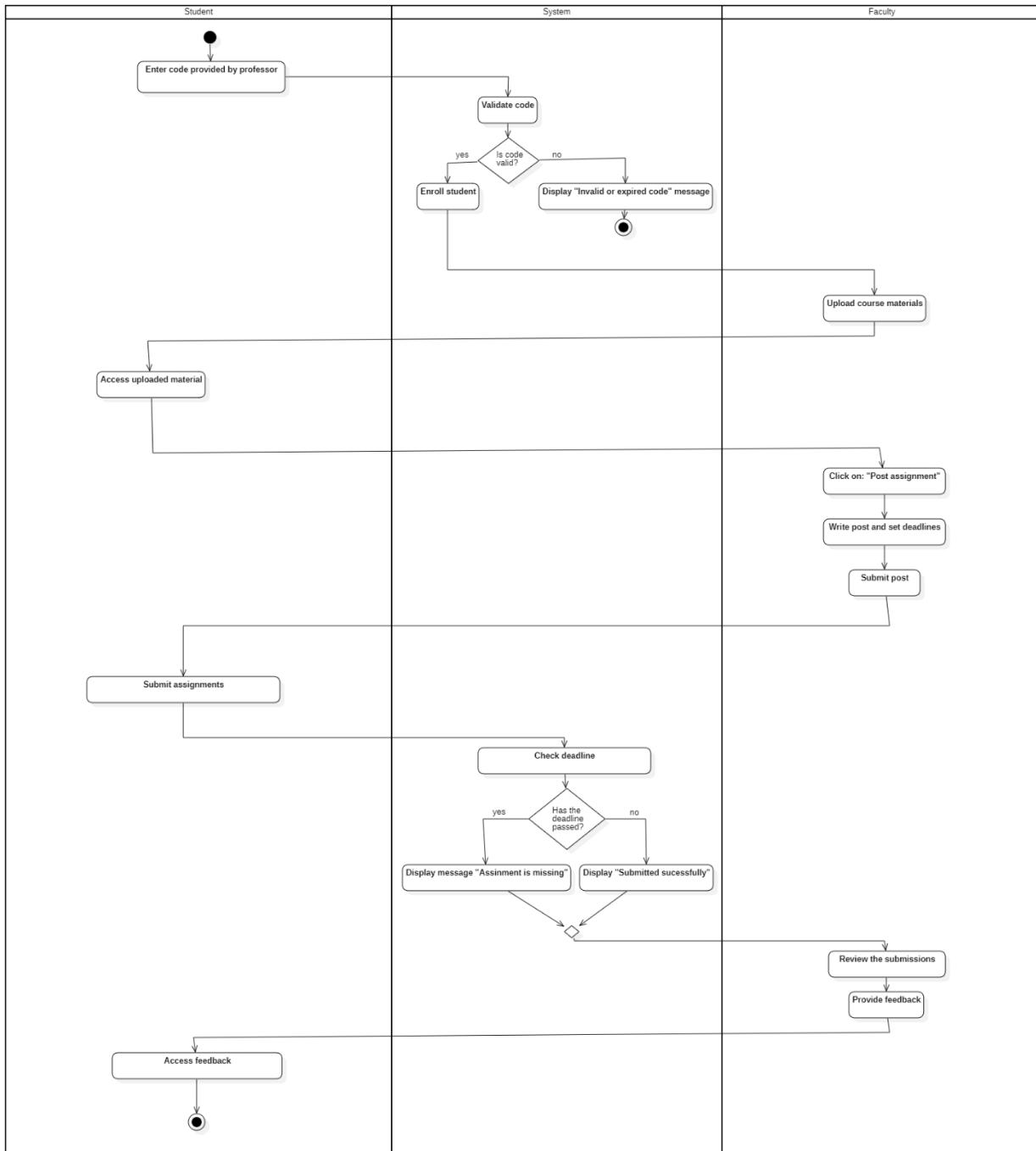
Activity Diagram – UIS-AD-5

Document Request



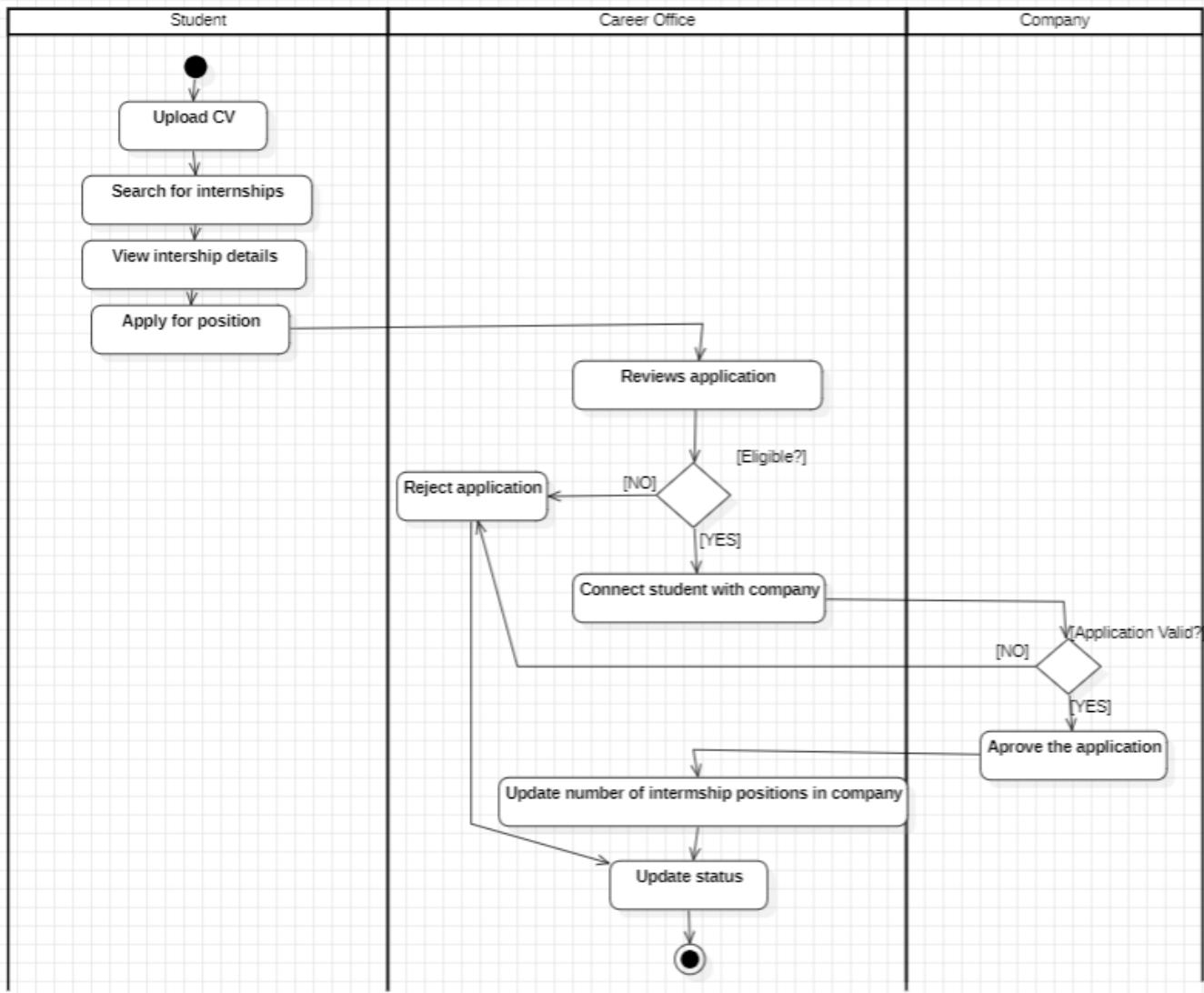
Activity Diagram – UIS-AD-6

Classroom & Learning Management



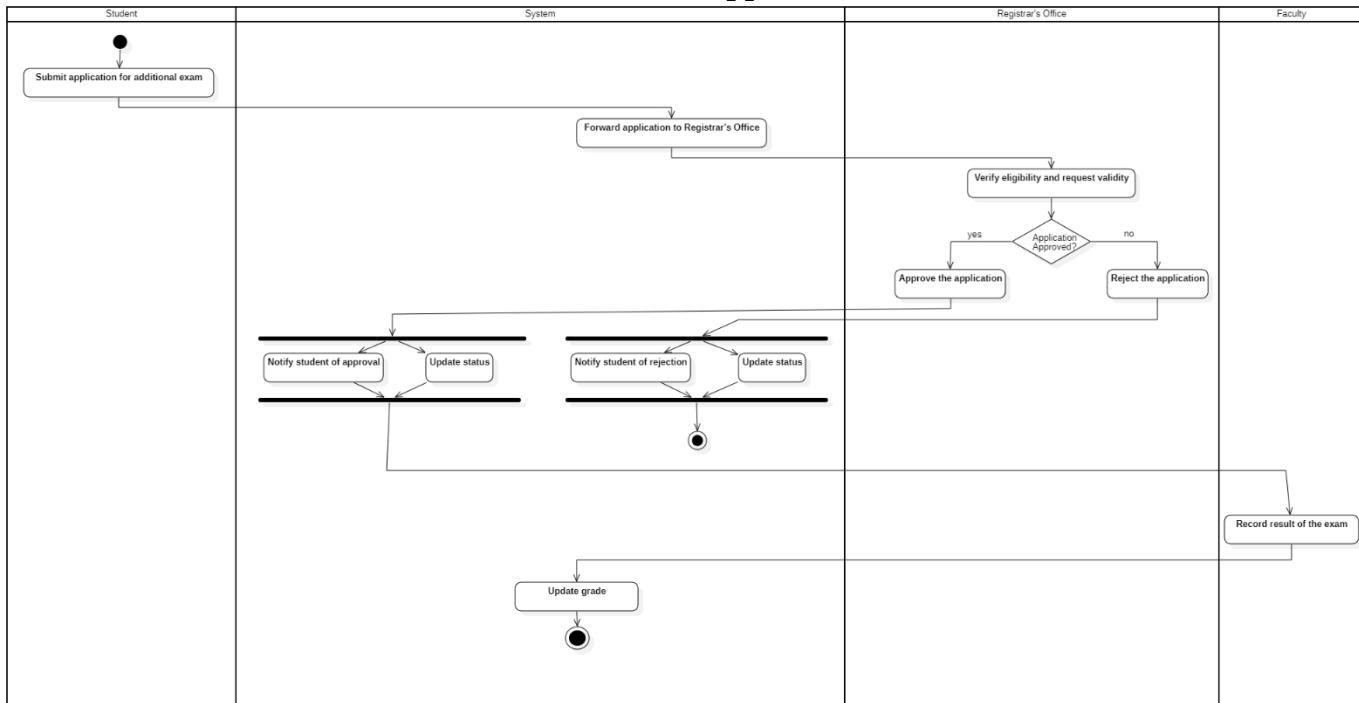
Activity Diagram – UIS-AD-7

Professional Practice & Career Services Process

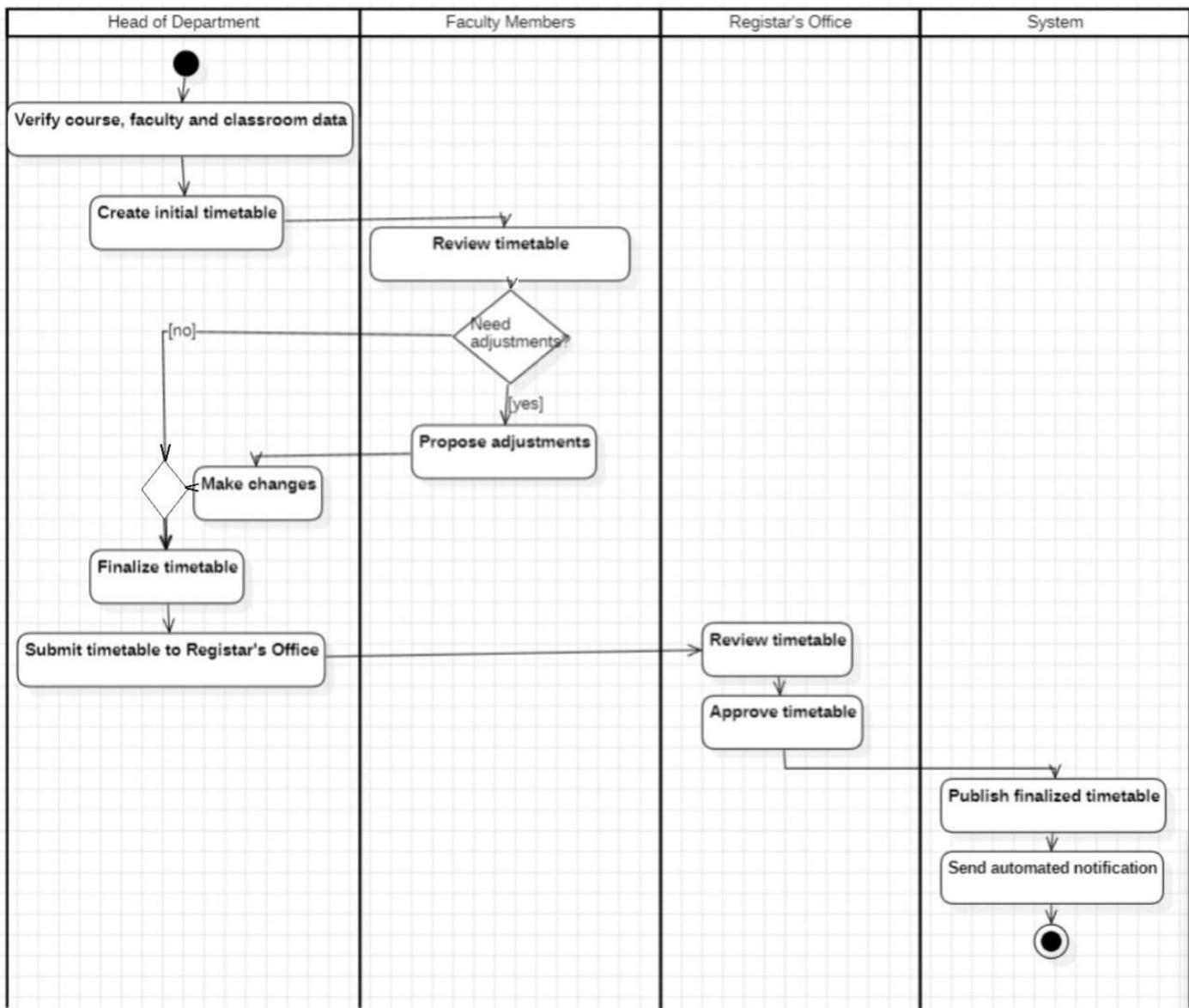


Activity Diagram – UIS-AD-8

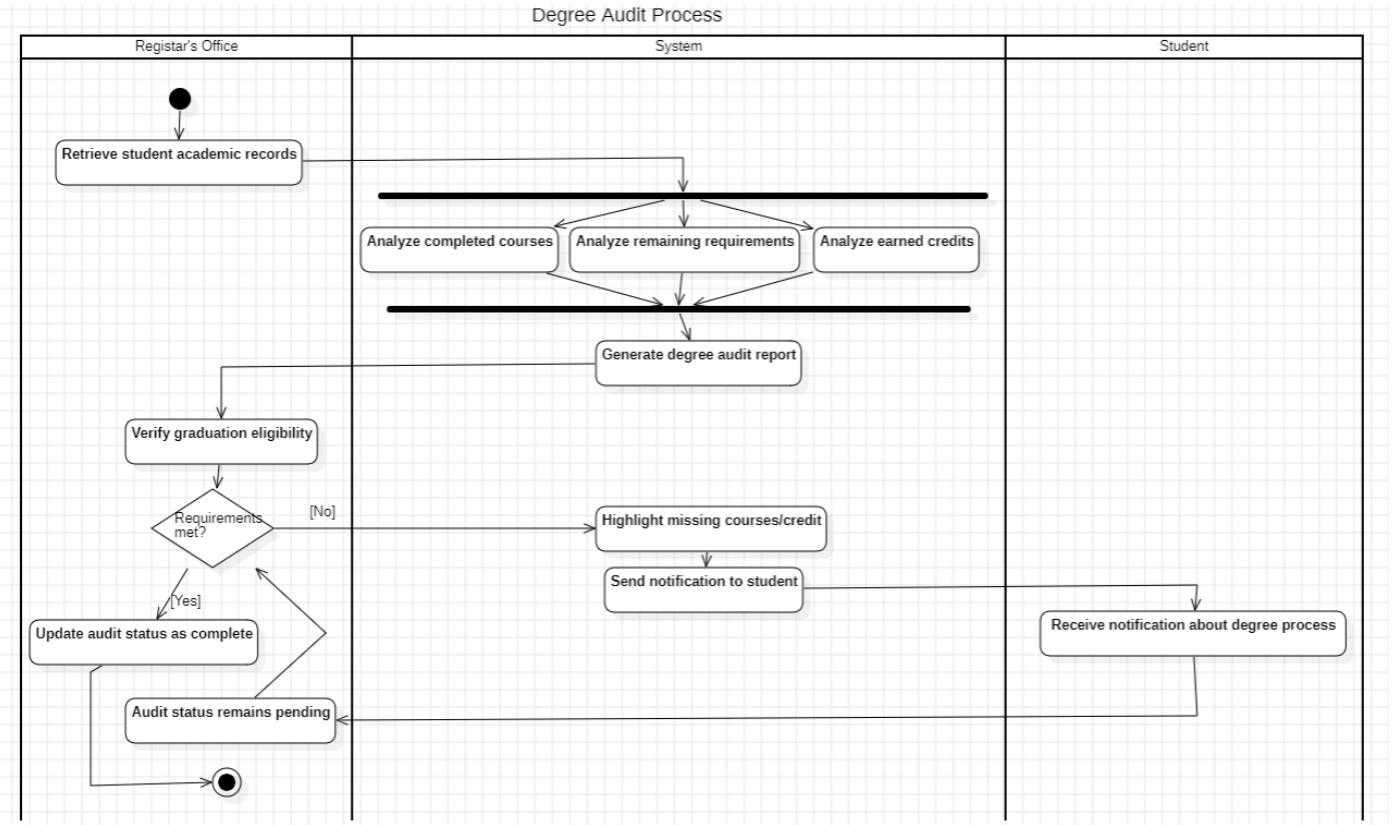
Additional Exam Application



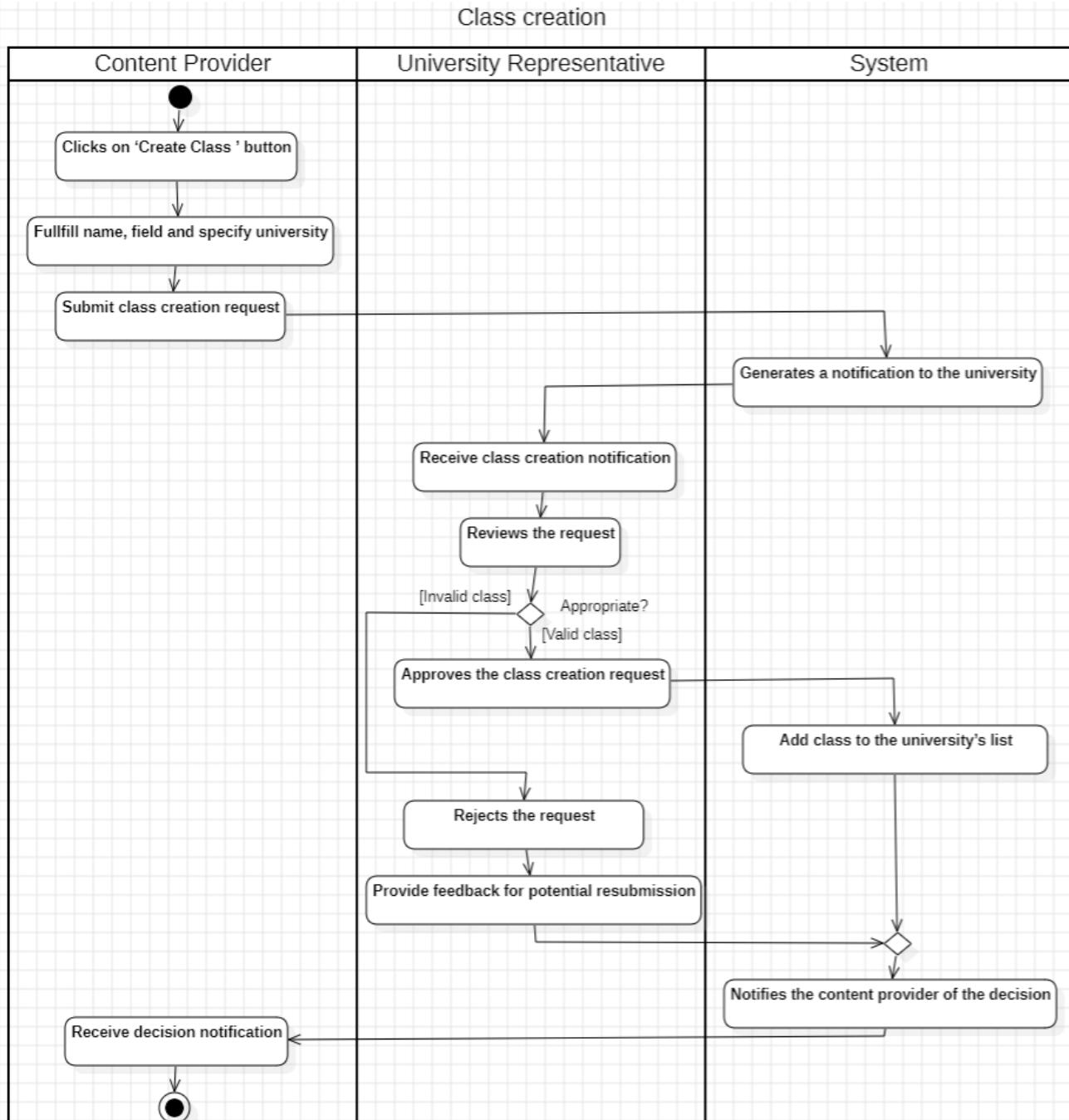
Activity Diagram – UIS-AD-9



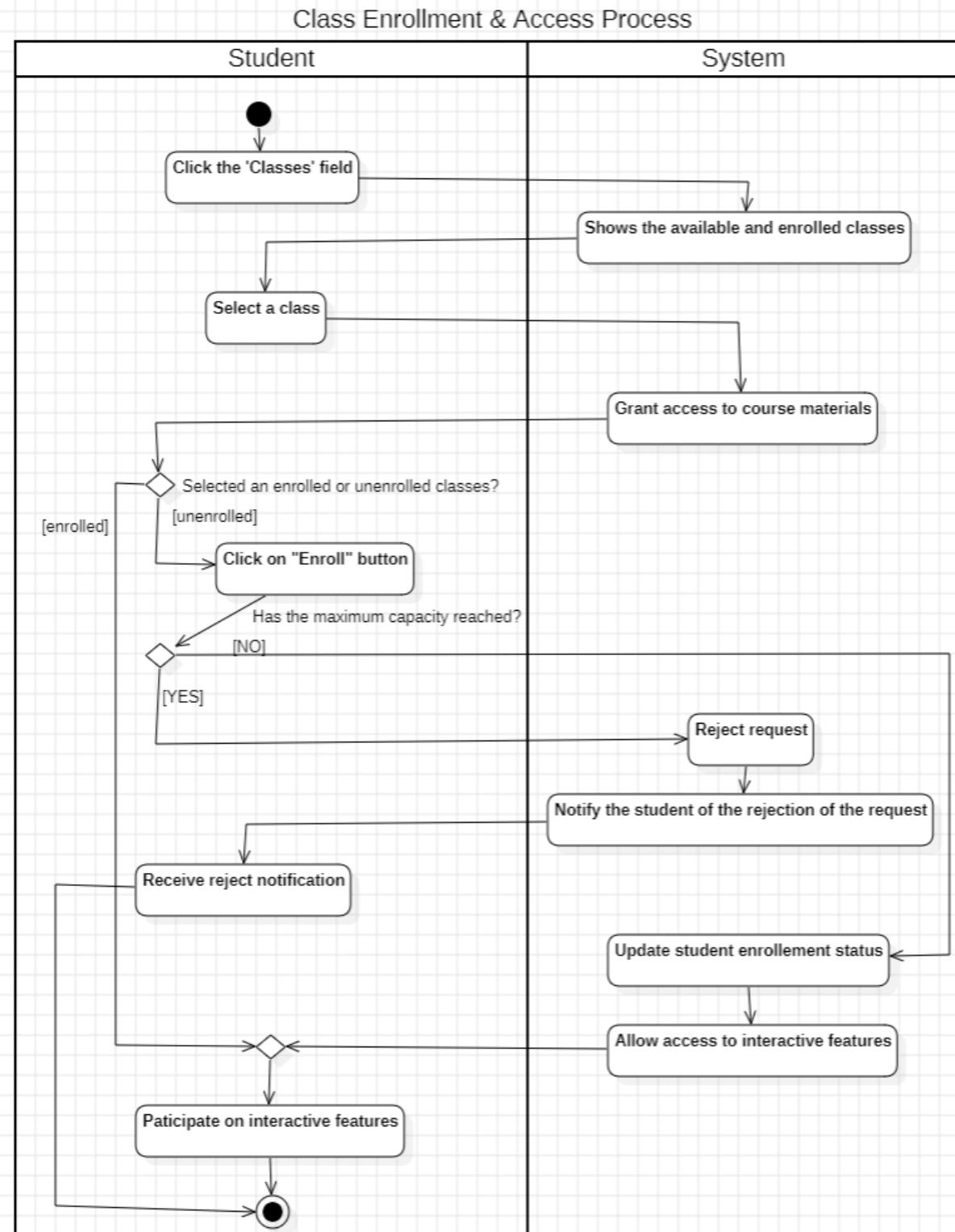
Activity Diagram – UIS-AD-10



Activity Diagram – ThinkLink-AD-1

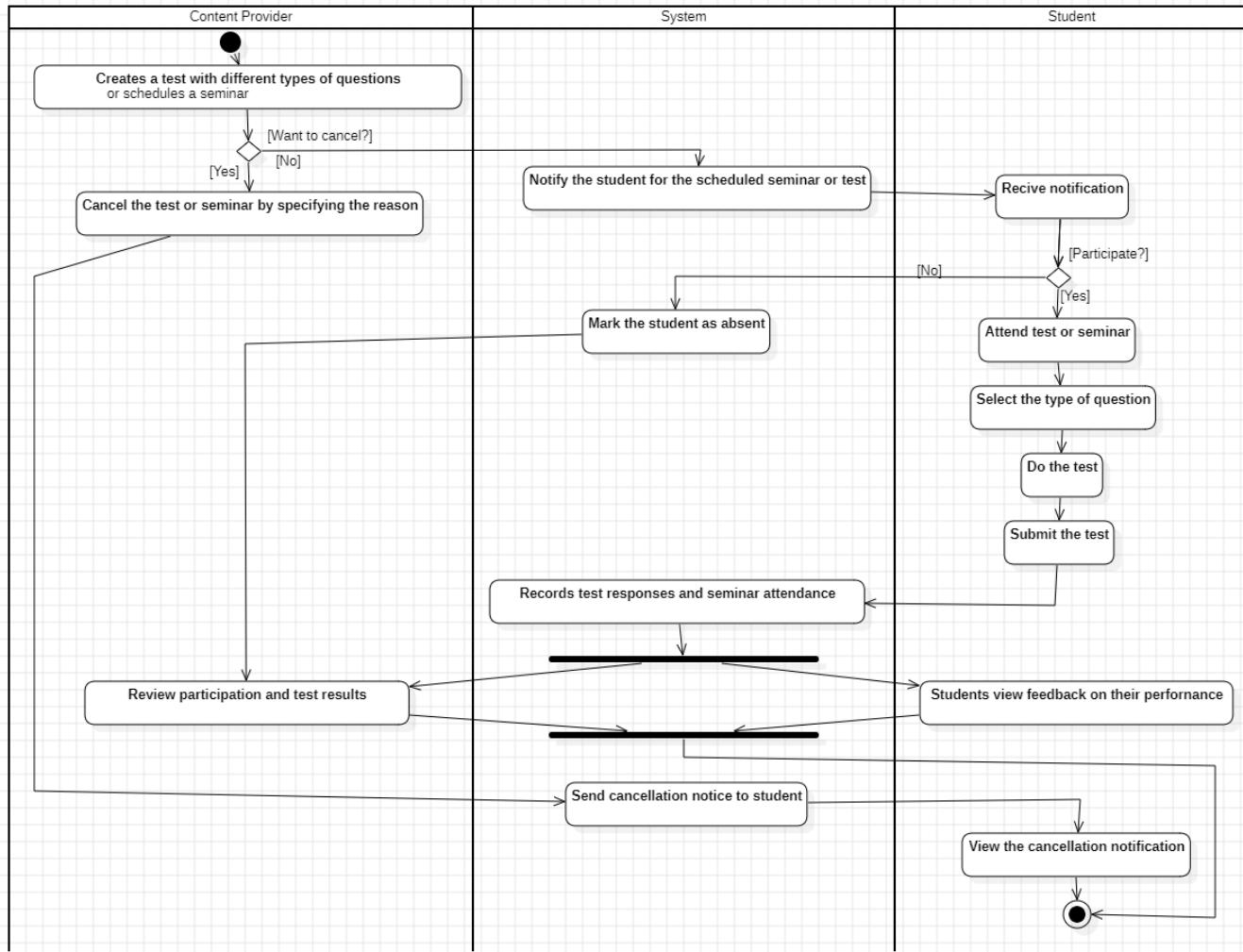


Activity Diagram – ThinkLink-AD-2

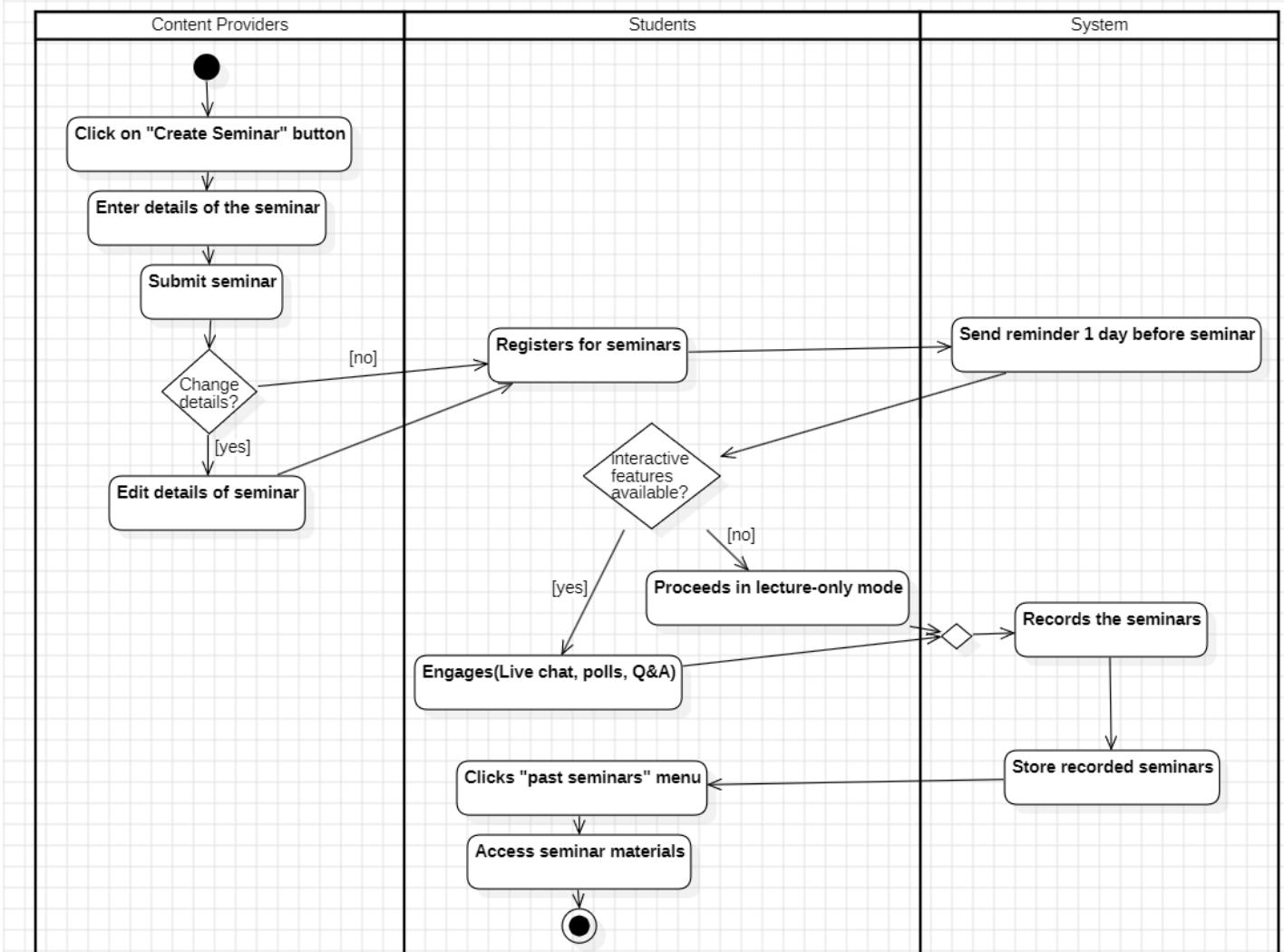


Activity Diagram – ThinkLink-AD-3

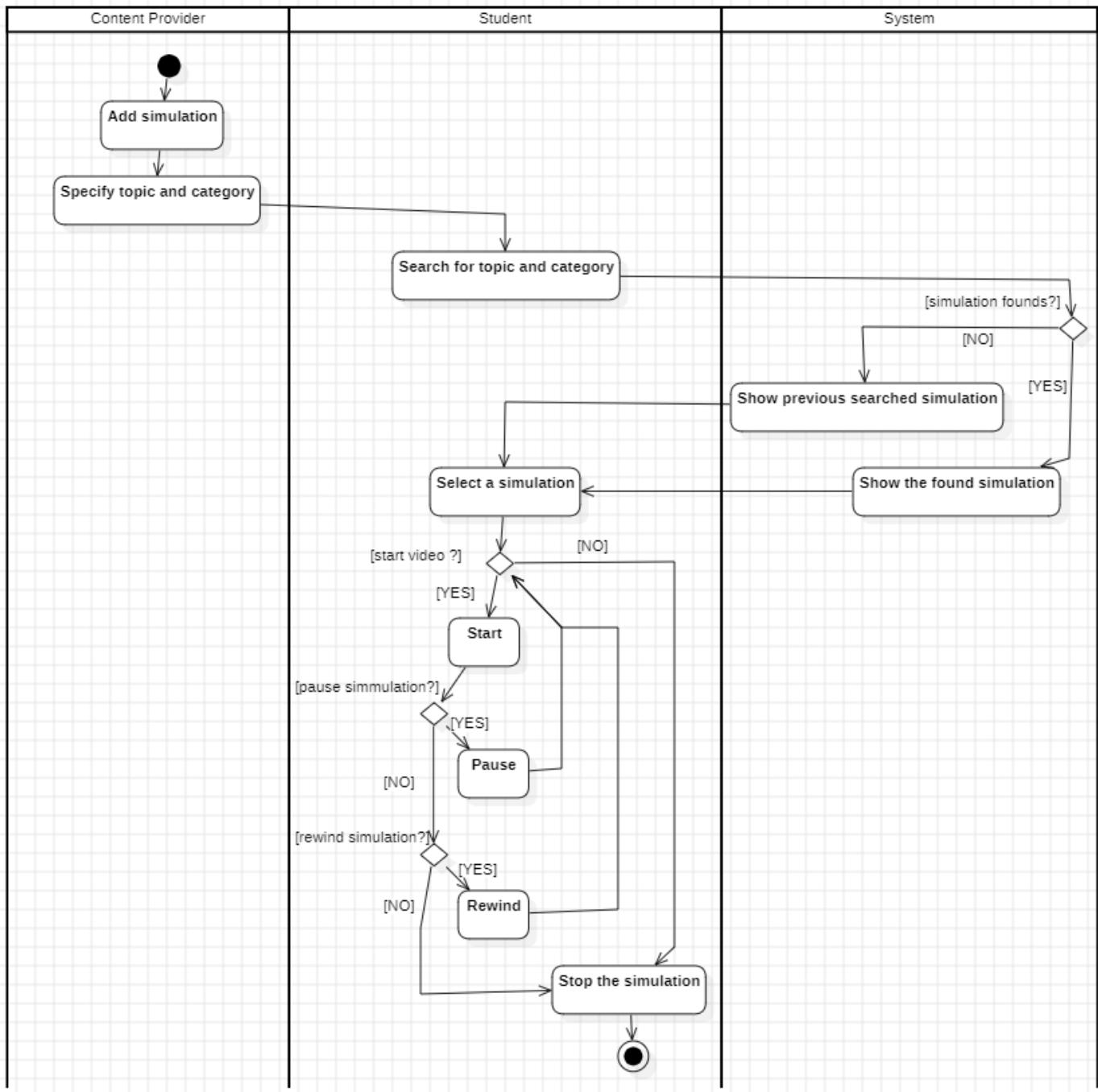
Test & Seminar Participation



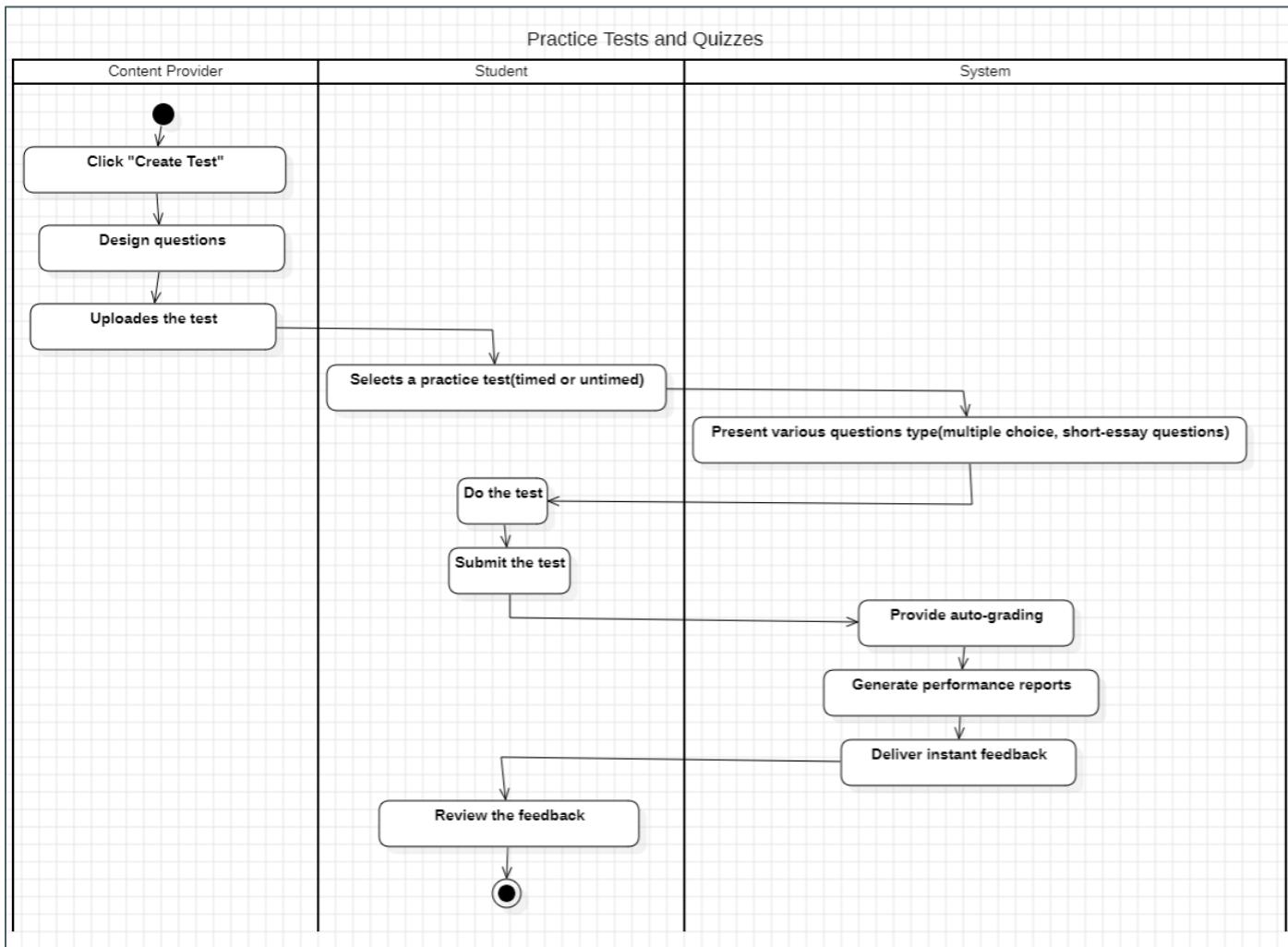
Activity Diagram – ThinkLink-AD-4



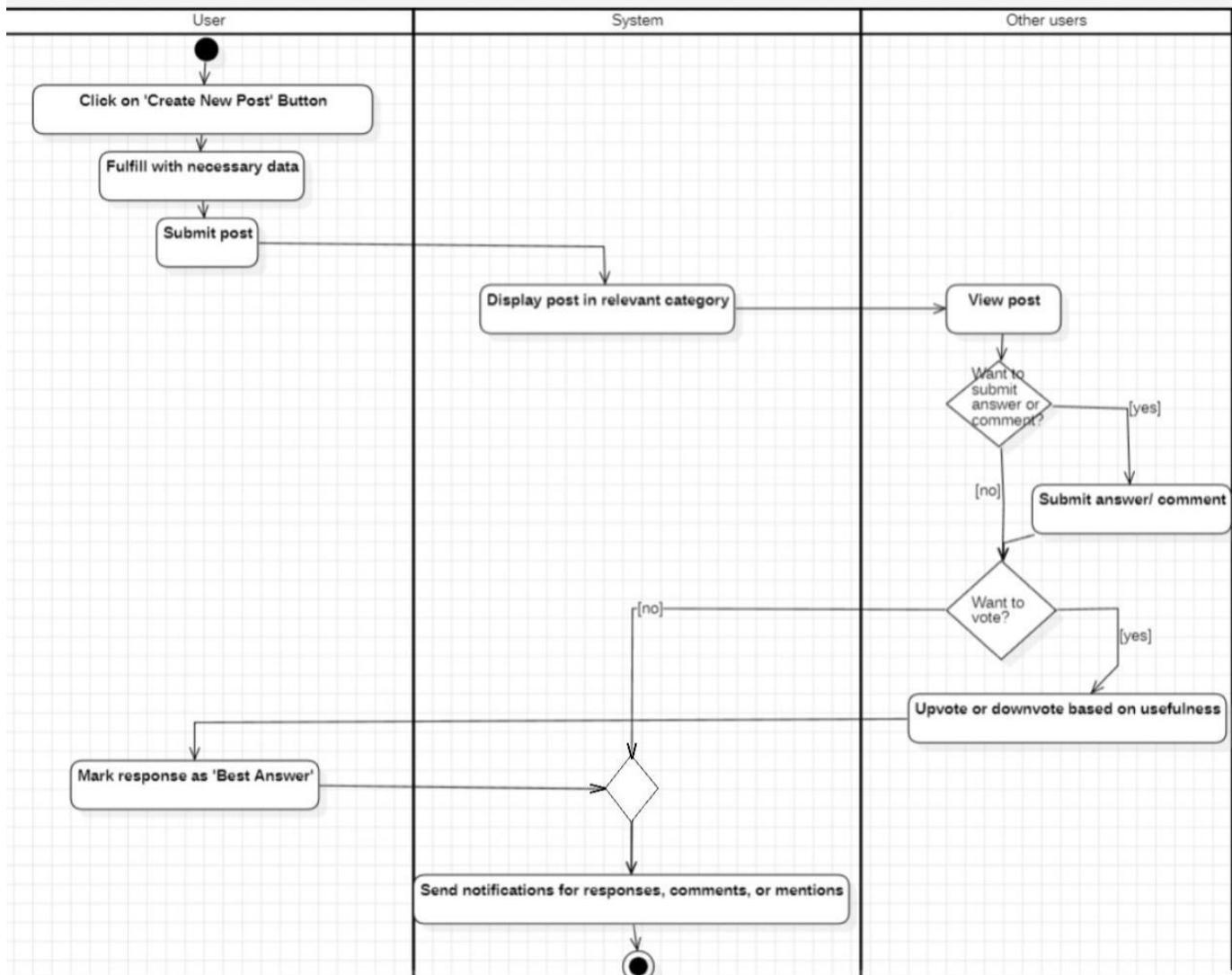
Activity Diagram – ThinkLink-AD-5



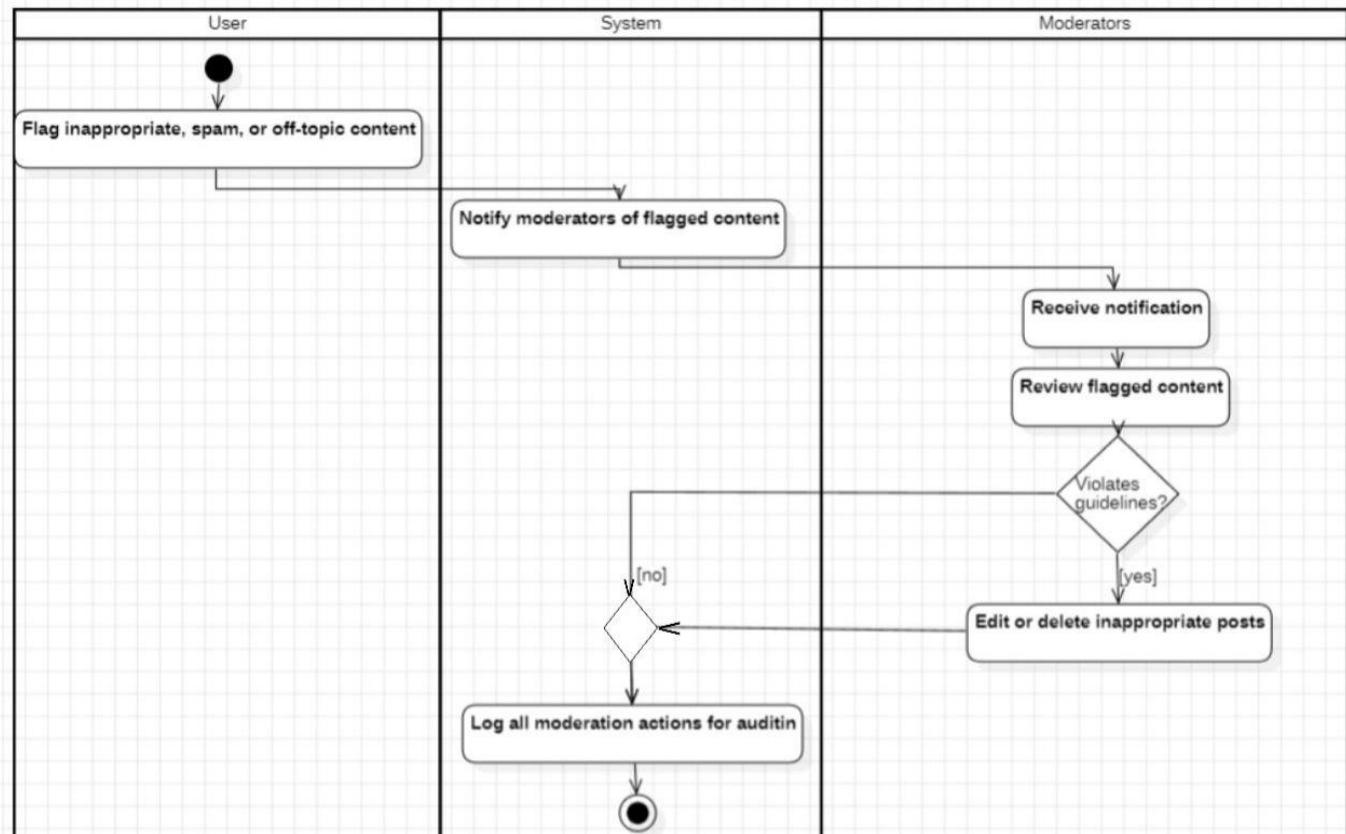
Activity Diagram – ThinkLink-AD-6



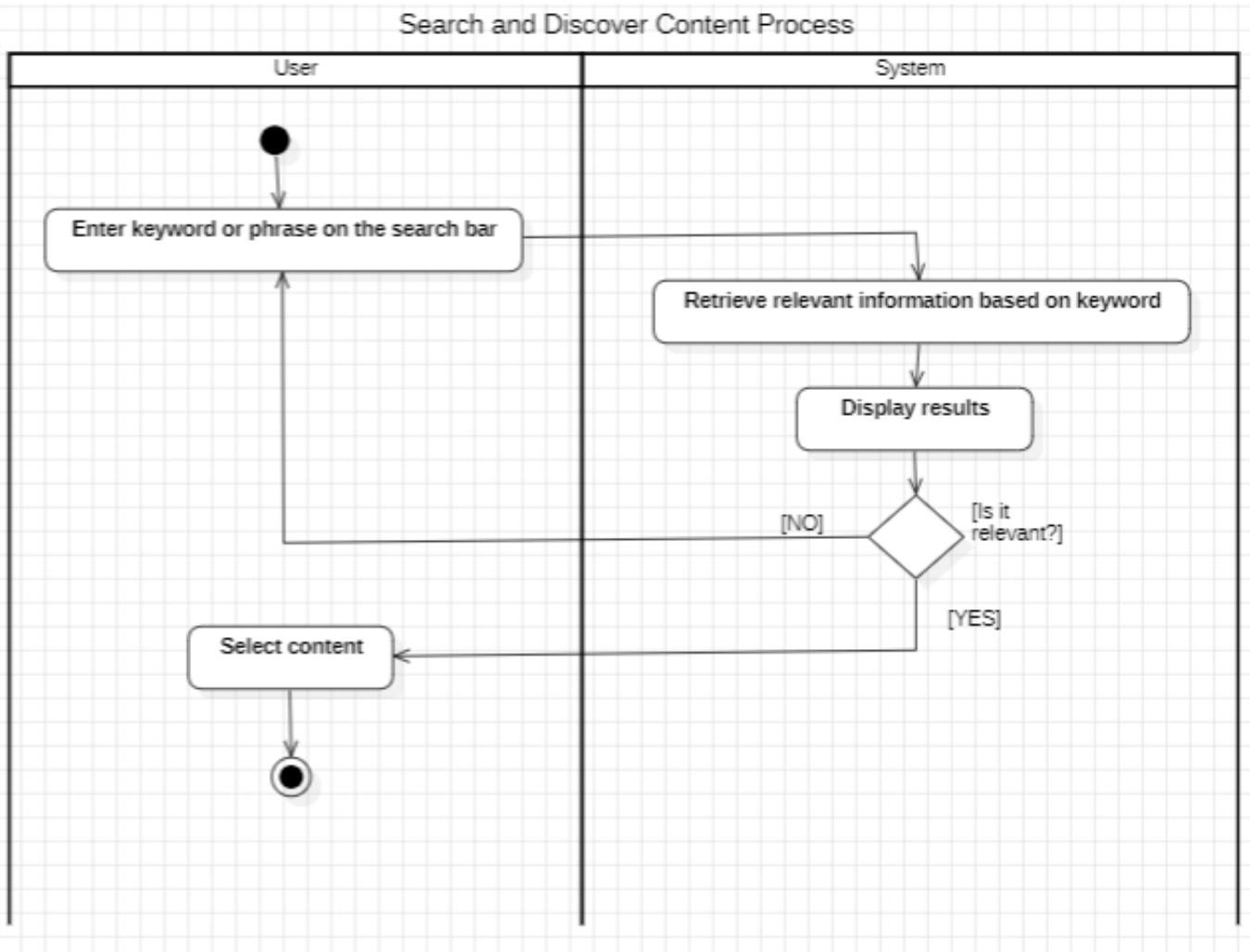
Activity Diagram – ThinkLink-AD-7



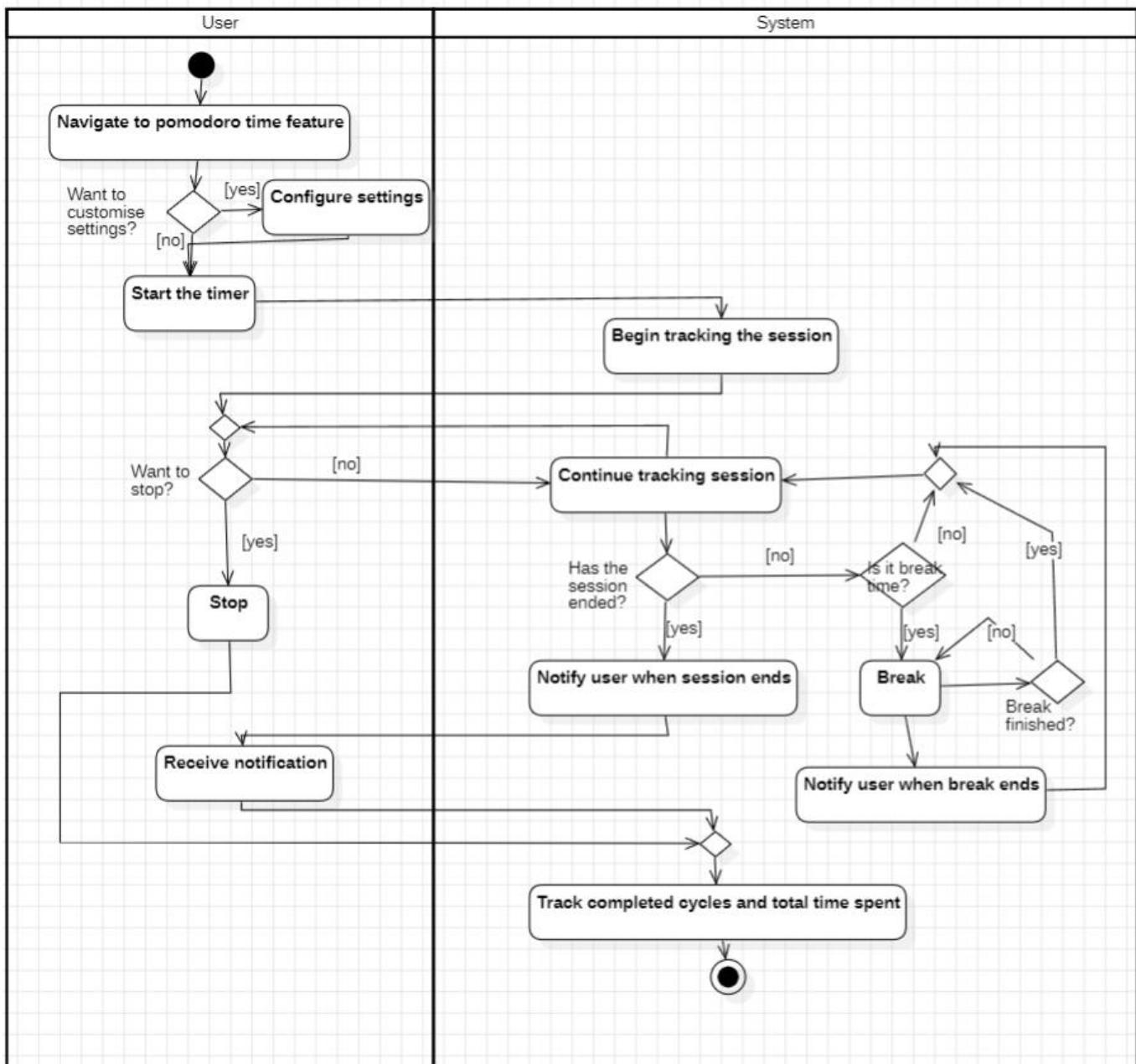
Activity Diagram – ThinkLink-AD-8



Activity Diagram – ThinkLink-AD-9

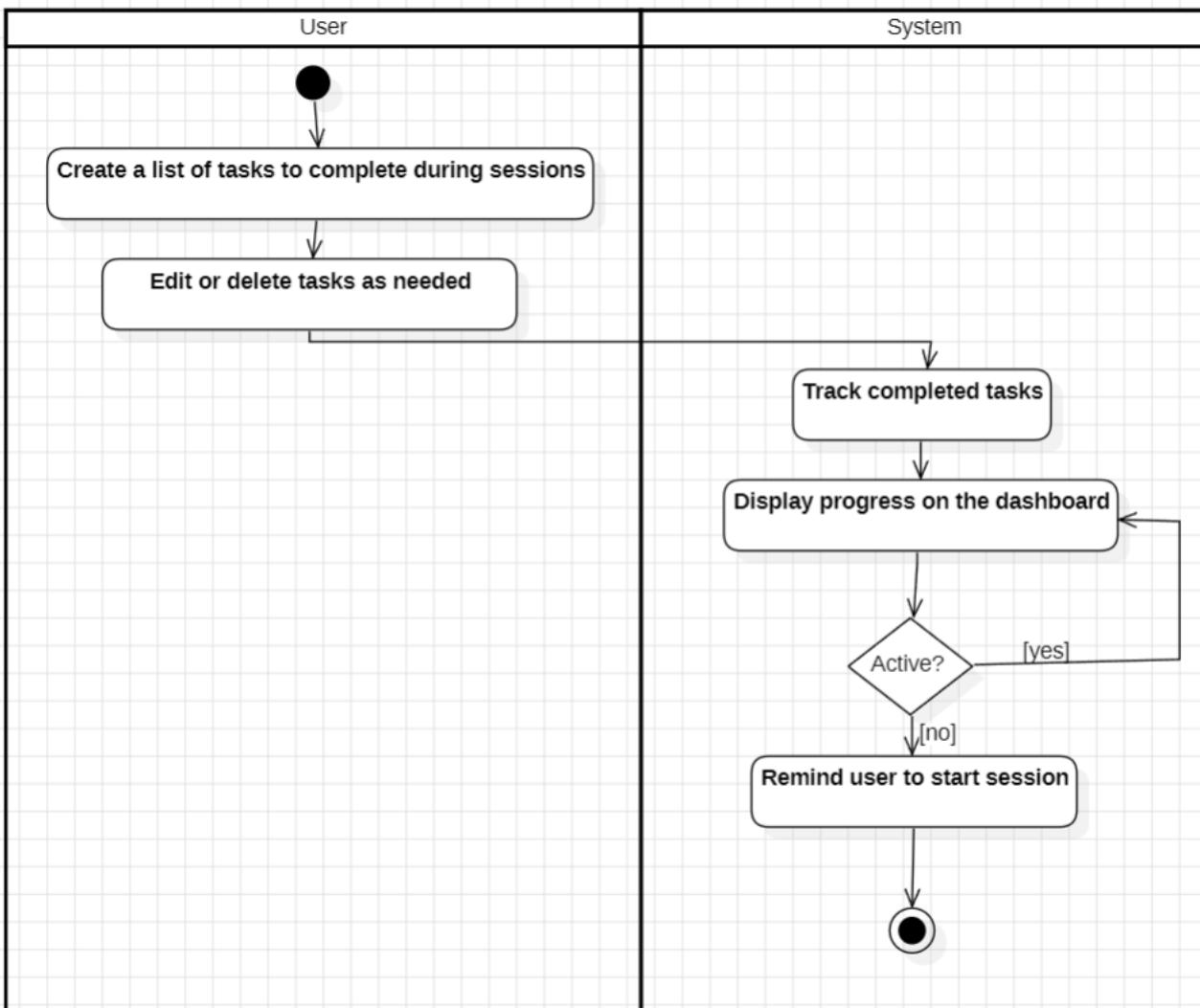


Activity Diagram – ThinkLink-AD-10



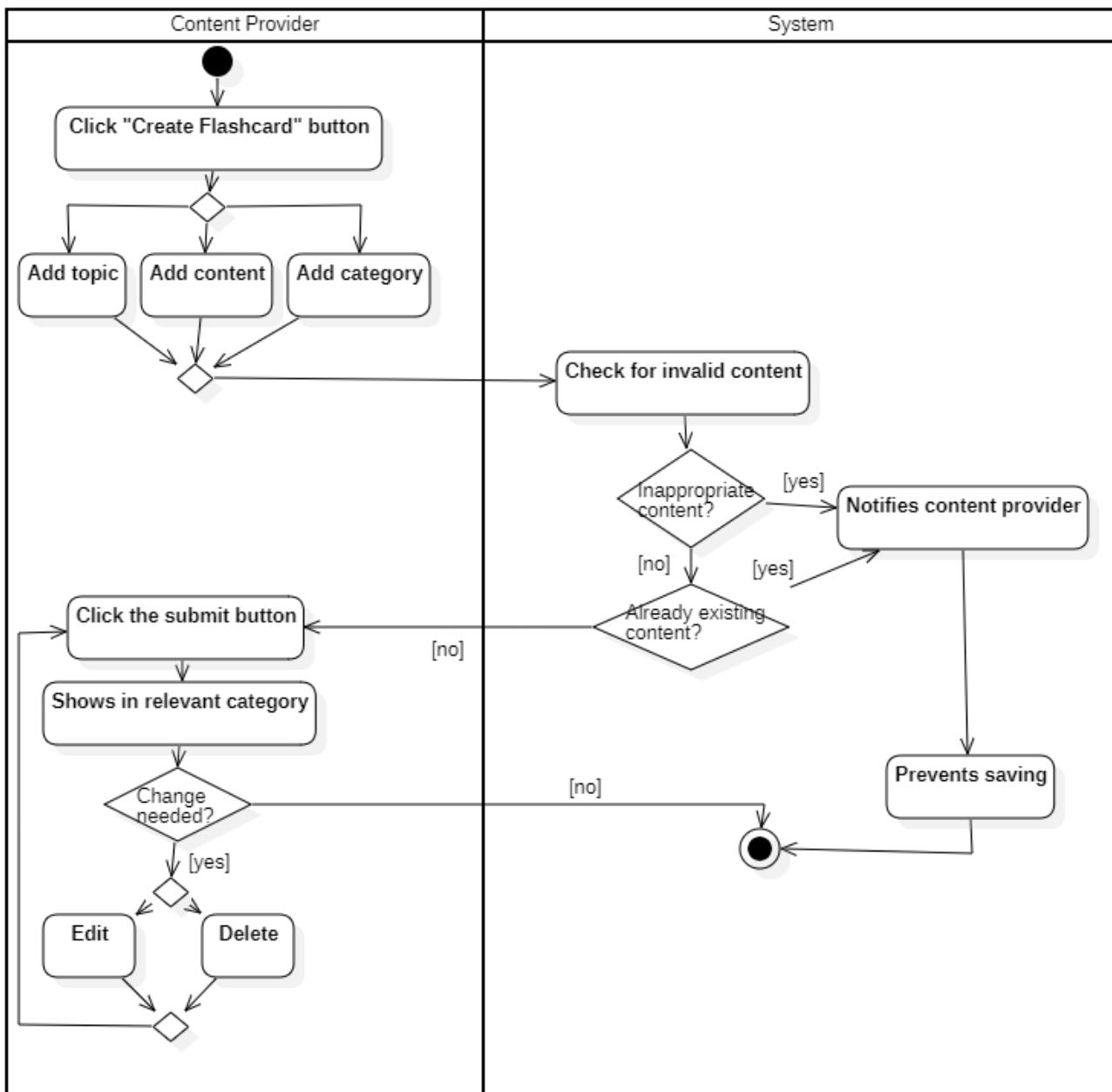
Activity Diagram – ThinkLink-AD-11

Task Management and Progress Tracking

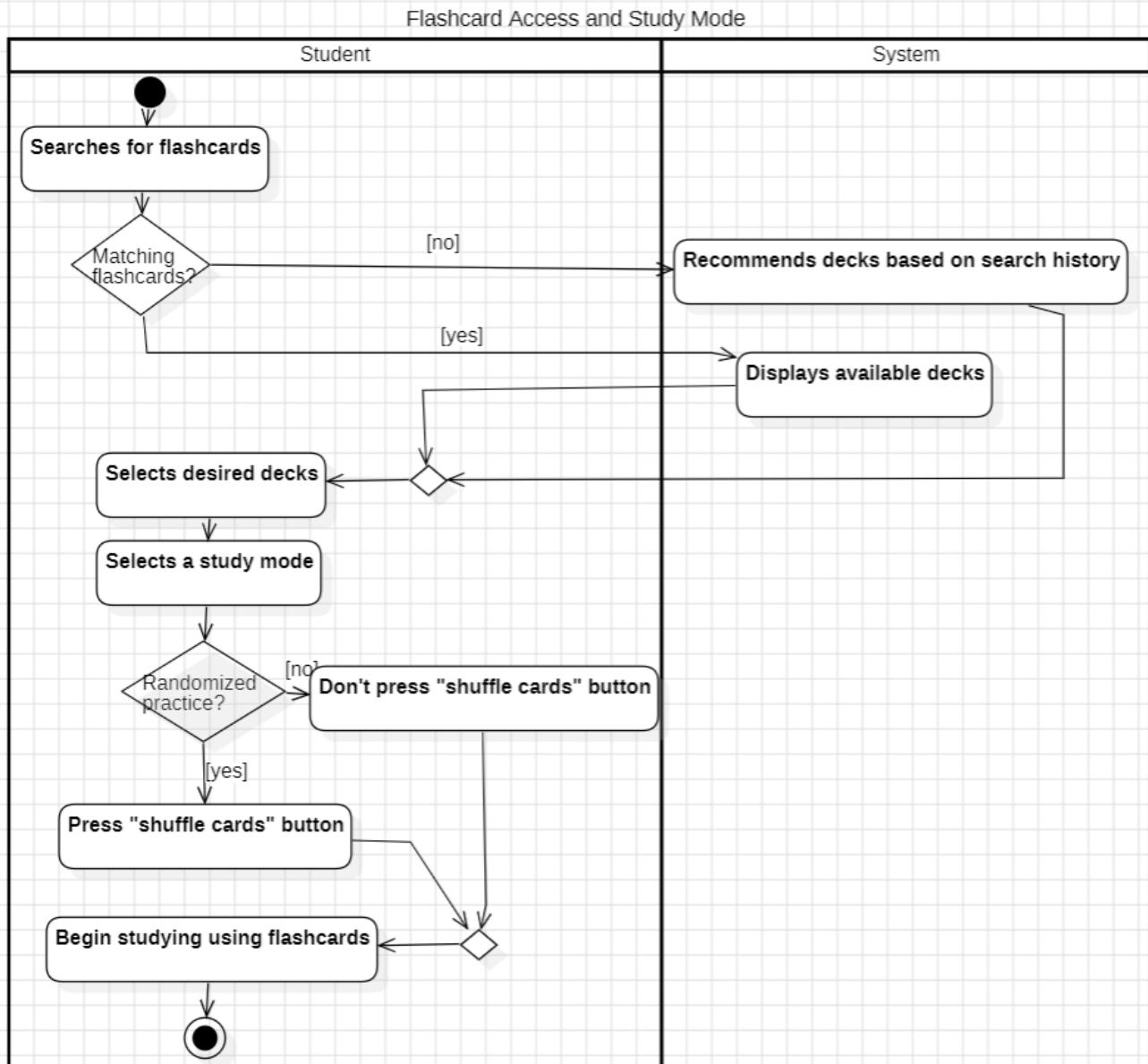


Activity Diagram – ThinkLink-AD-12

FlashCard Creation & Management

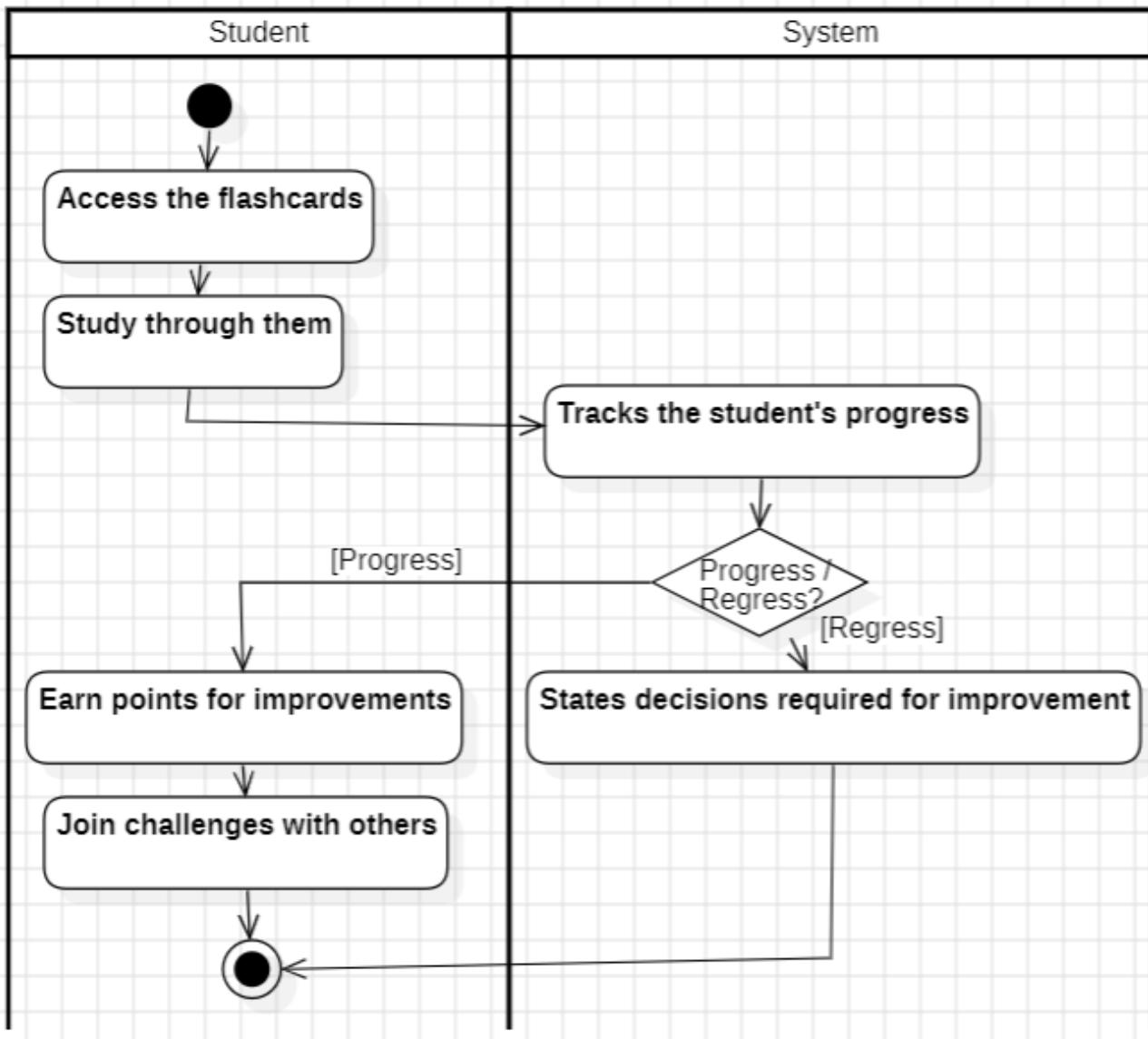


Activity Diagram – ThinkLink-AD-13



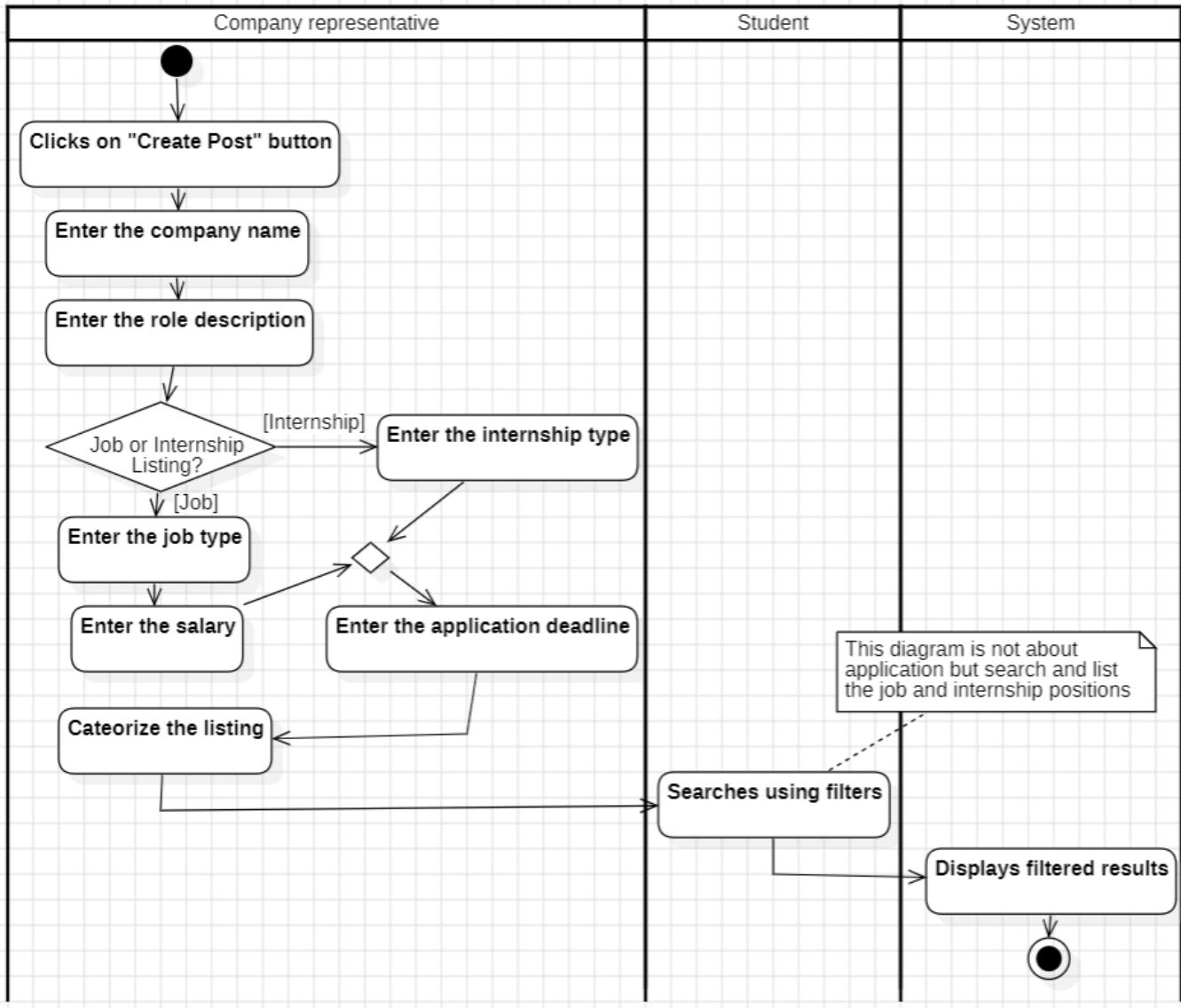
Activity Diagram – ThinkLink-AD-14

Tracking and Gamifications



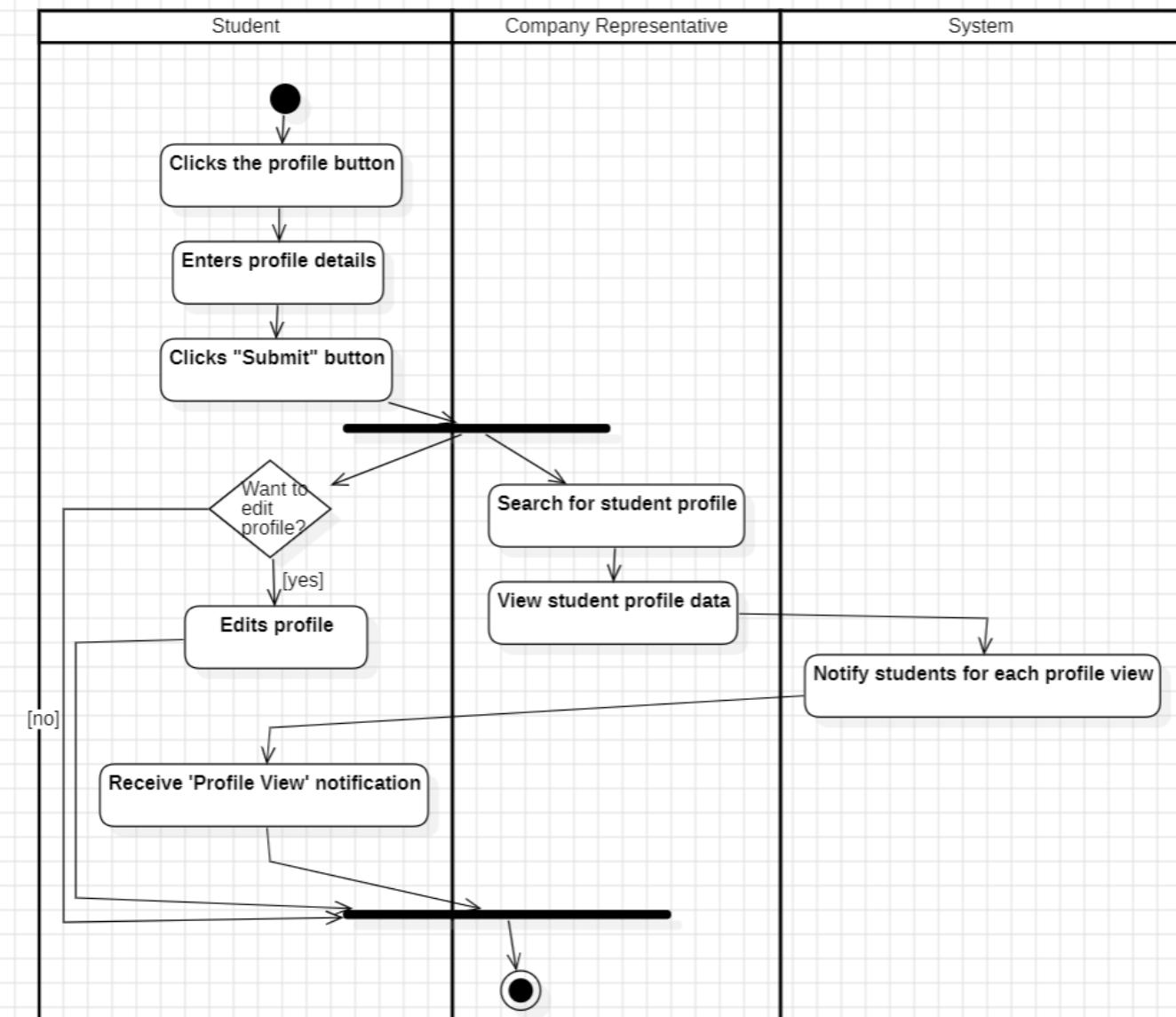
Activity Diagram – ThinkLink-AD-15

Job and Internship Listing



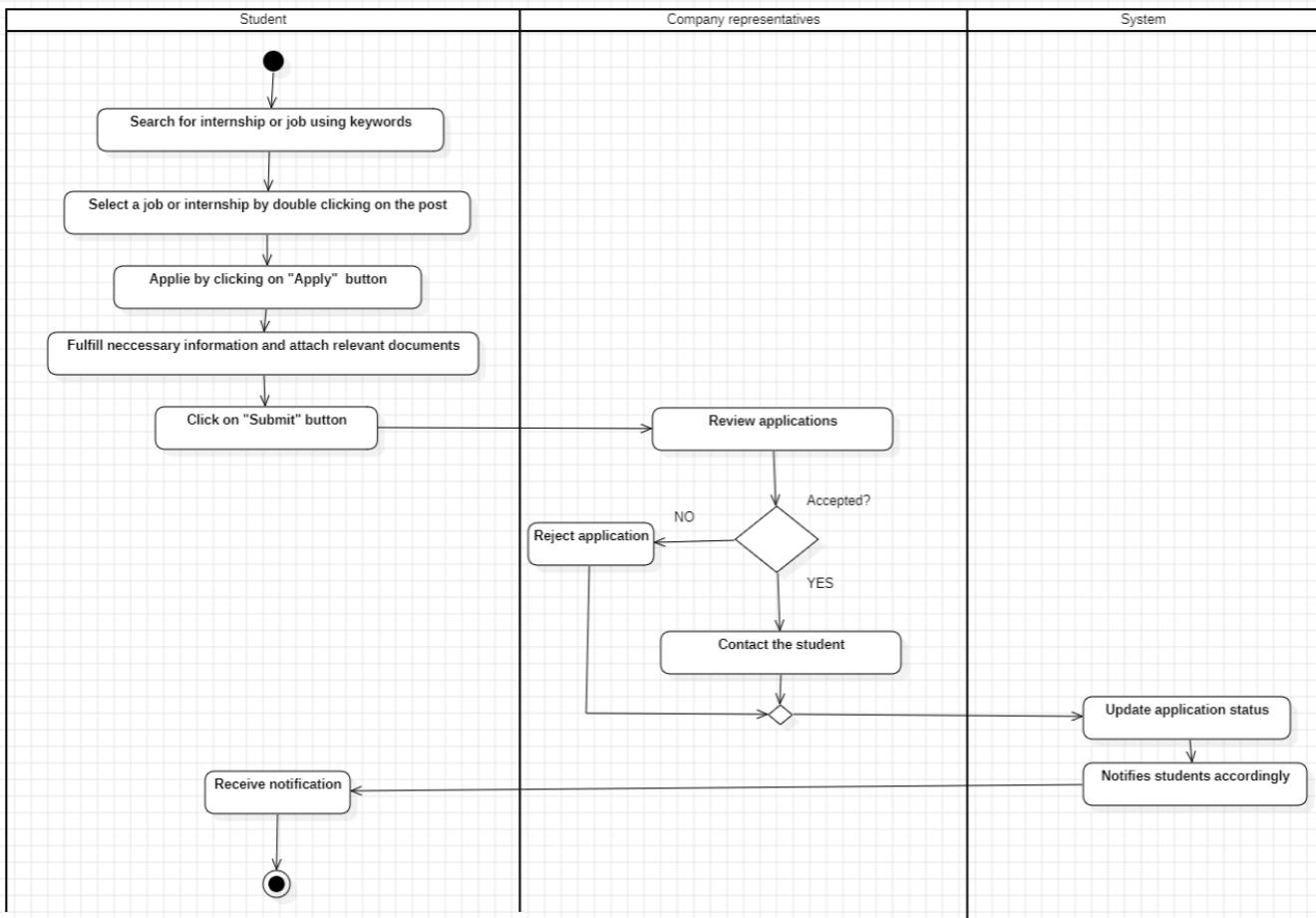
Activity Diagram – ThinkLink-AD-16

Profile Creation Process

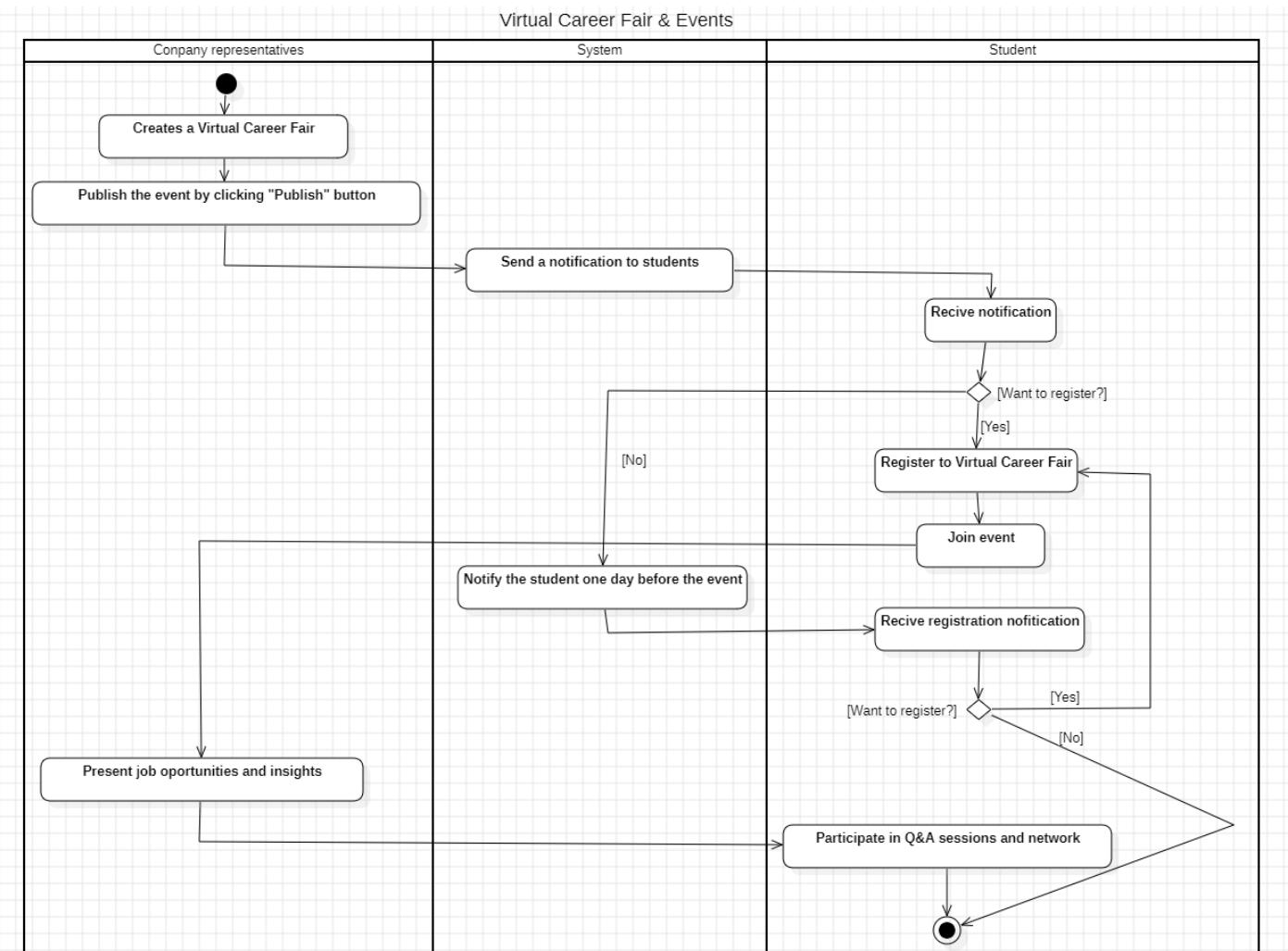


Activity Diagram – ThinkLink-AD-17

Search & Application Process

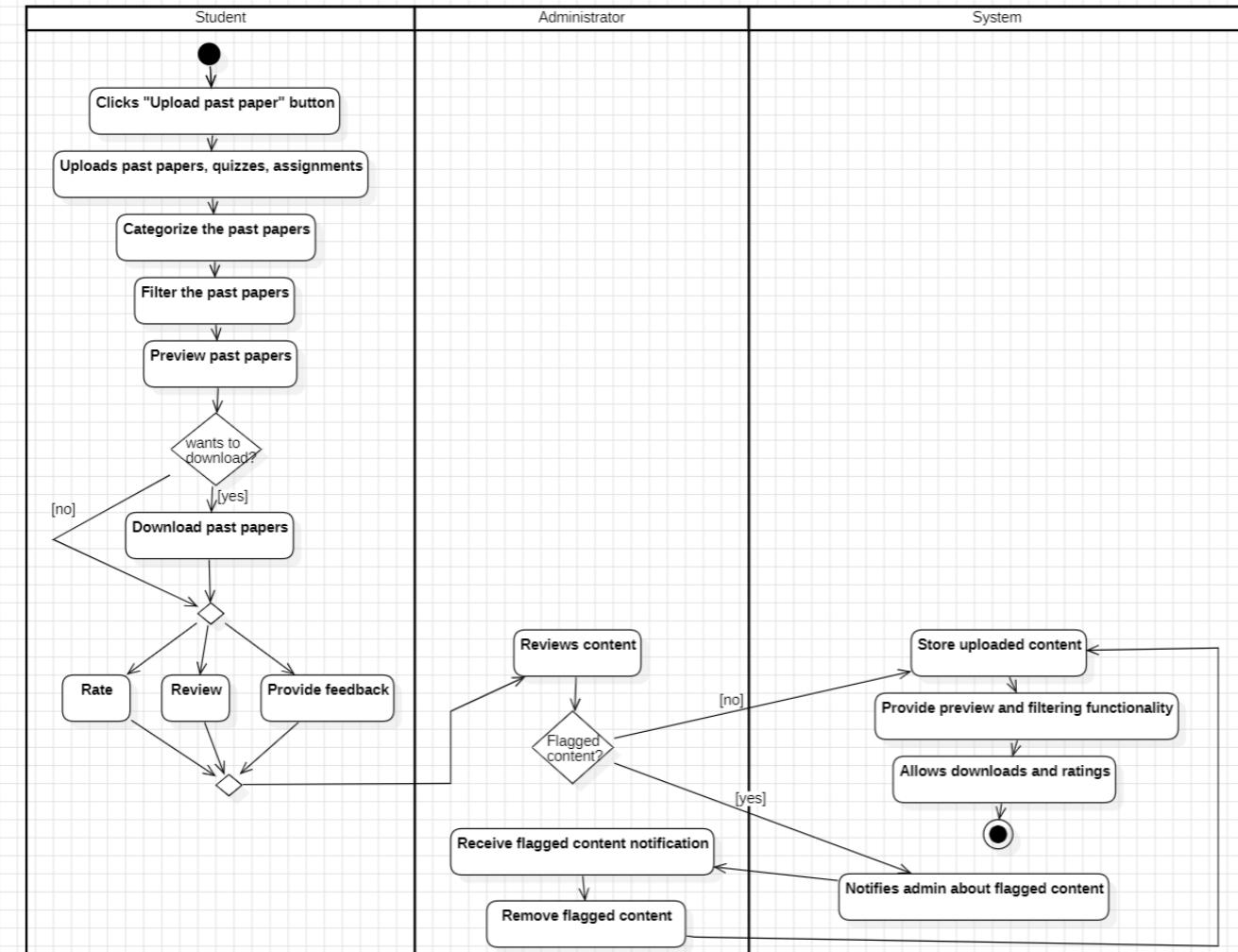


Activity Diagram – ThinkLink-AD-18

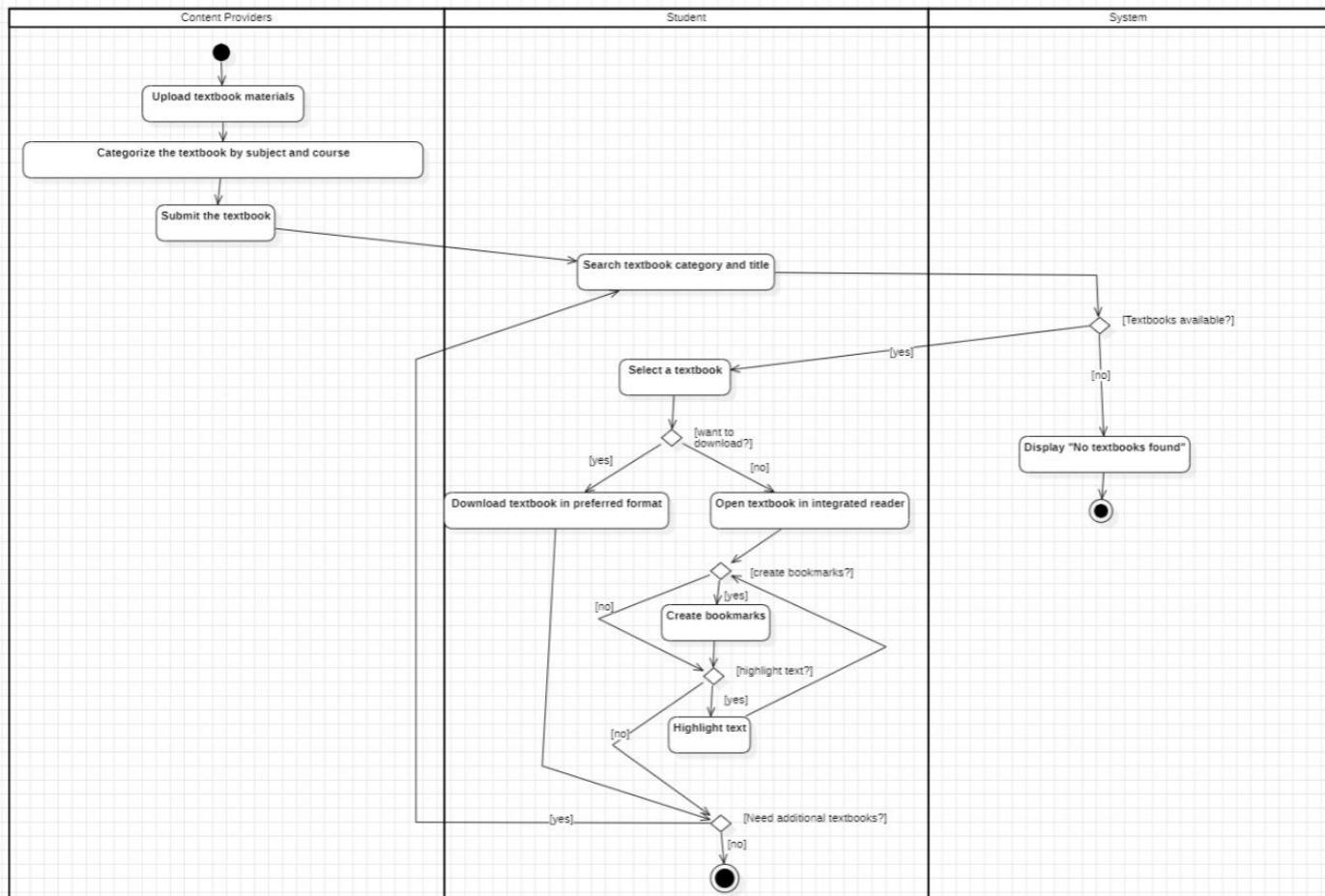


Activity Diagram – ThinkLink-AD-19

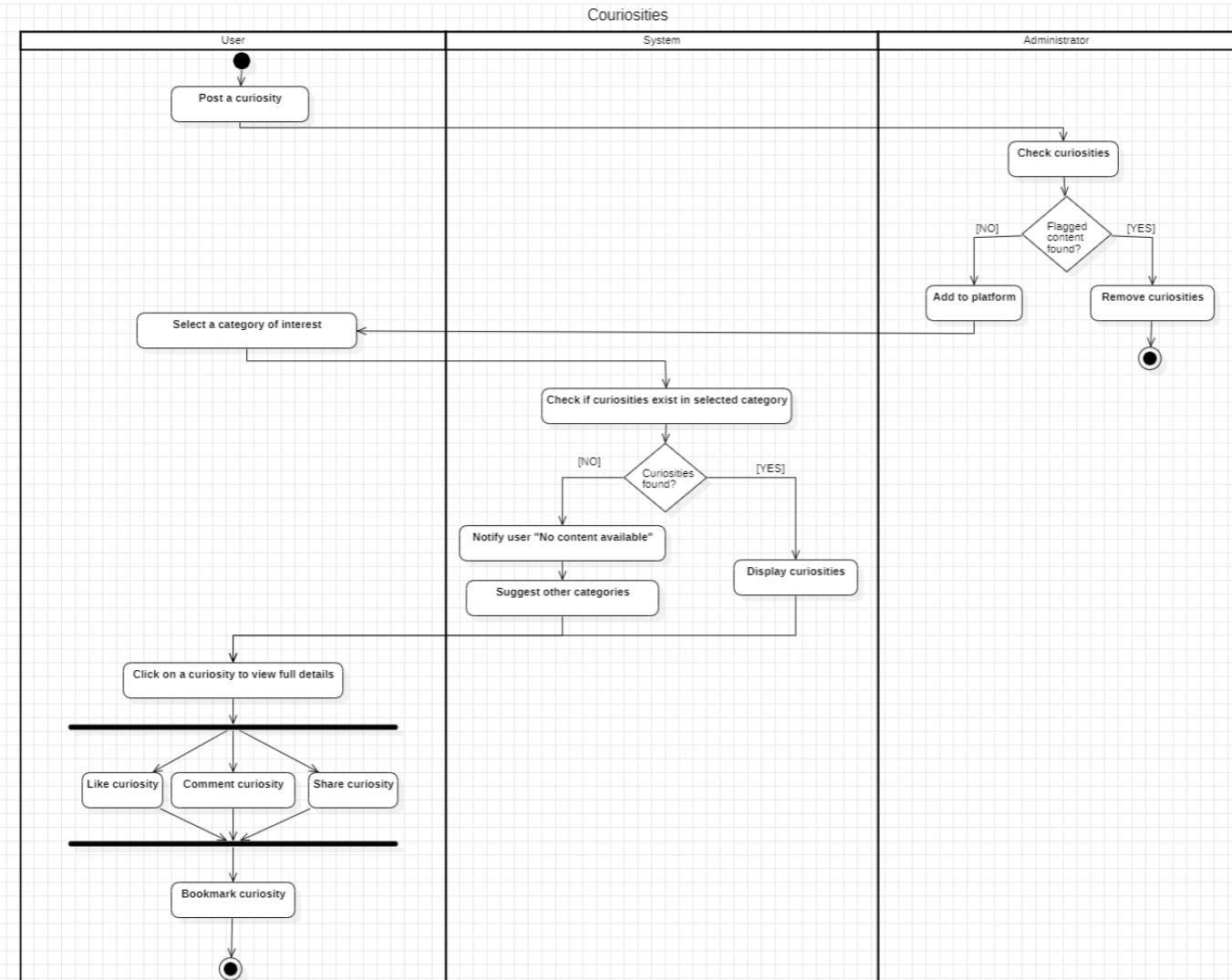
Past Paper Process



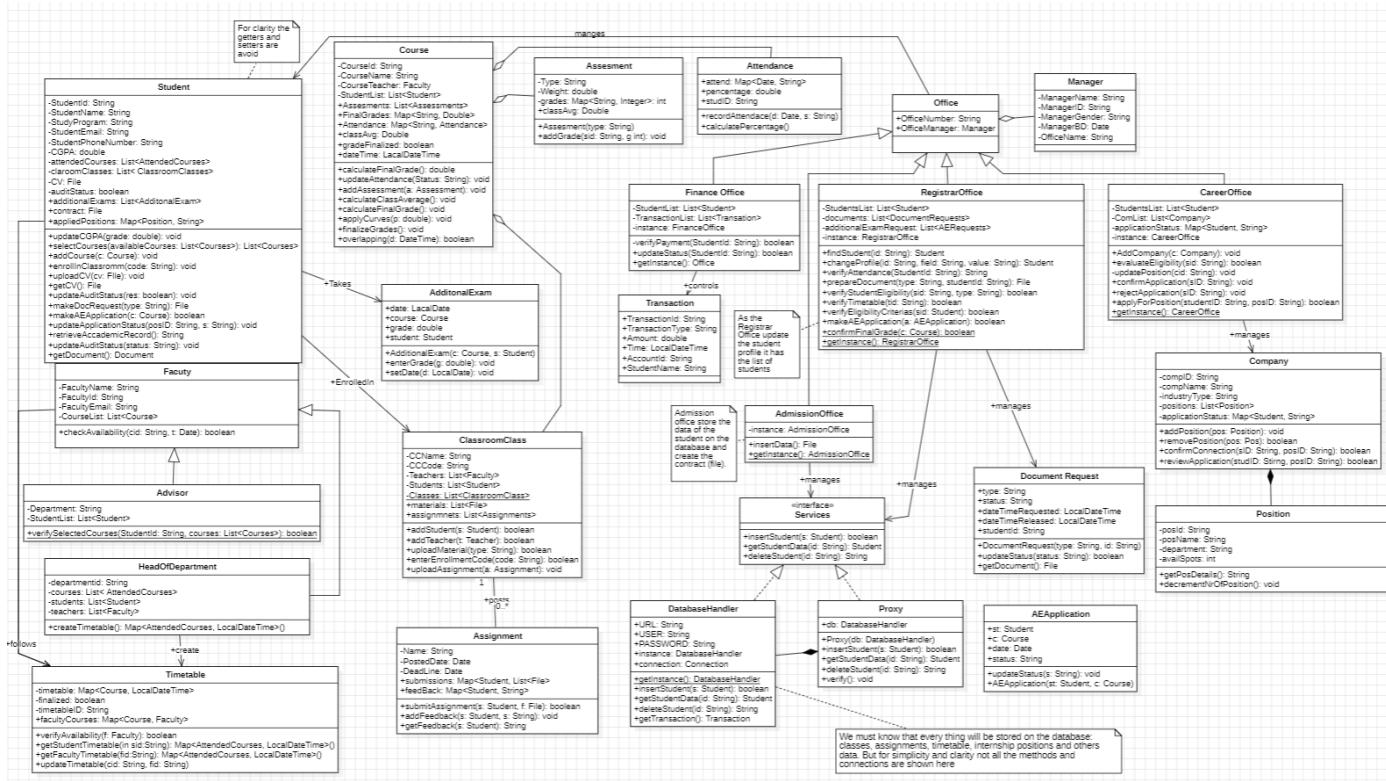
Activity Diagram – ThinkLink-AD-20



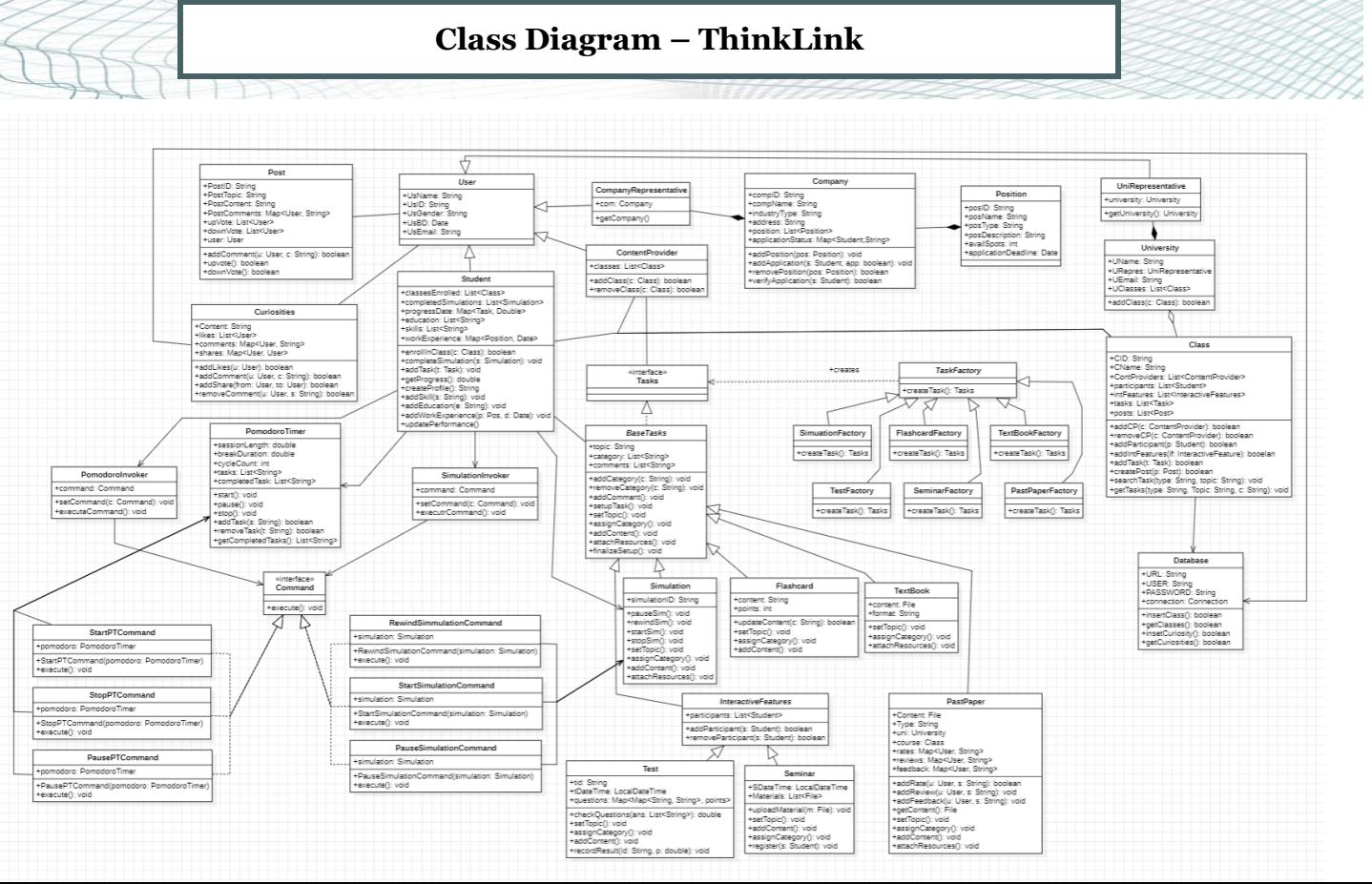
Activity Diagram – ThinkLink-AD-21



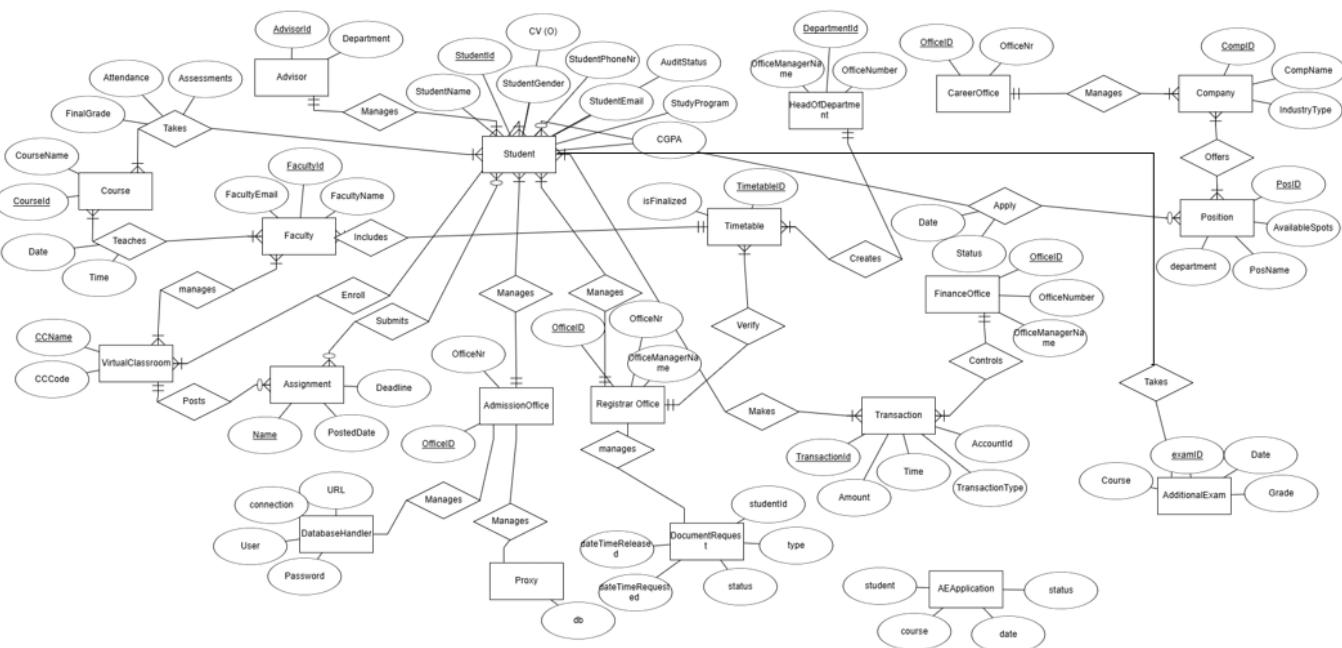
Class Diagram – UIS



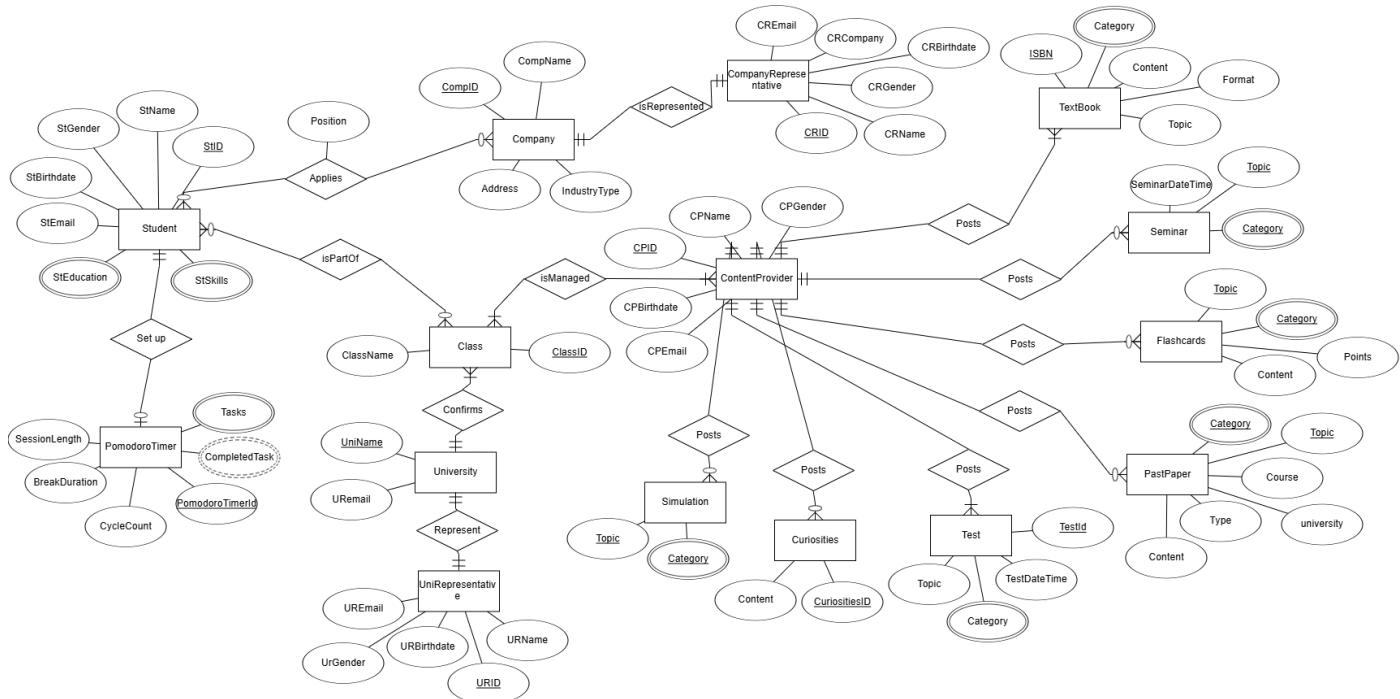
Class Diagram – ThinkLink



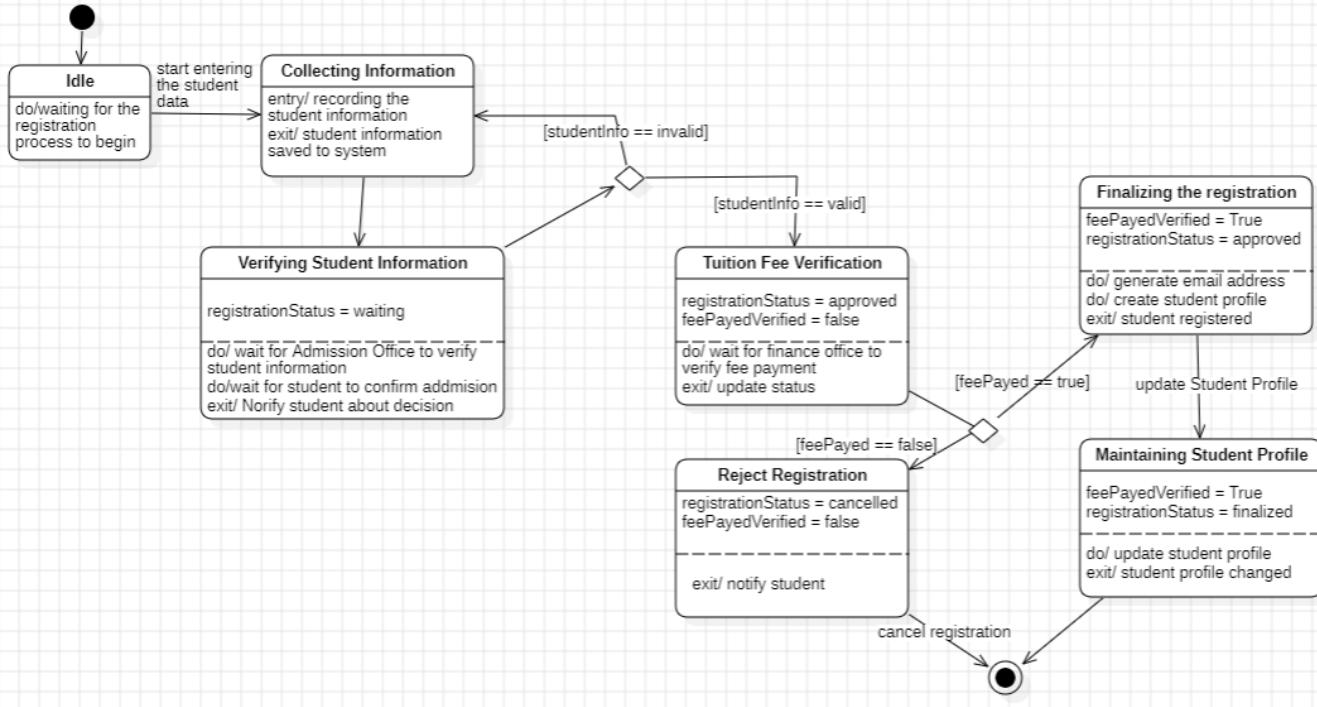
ERD – UIS



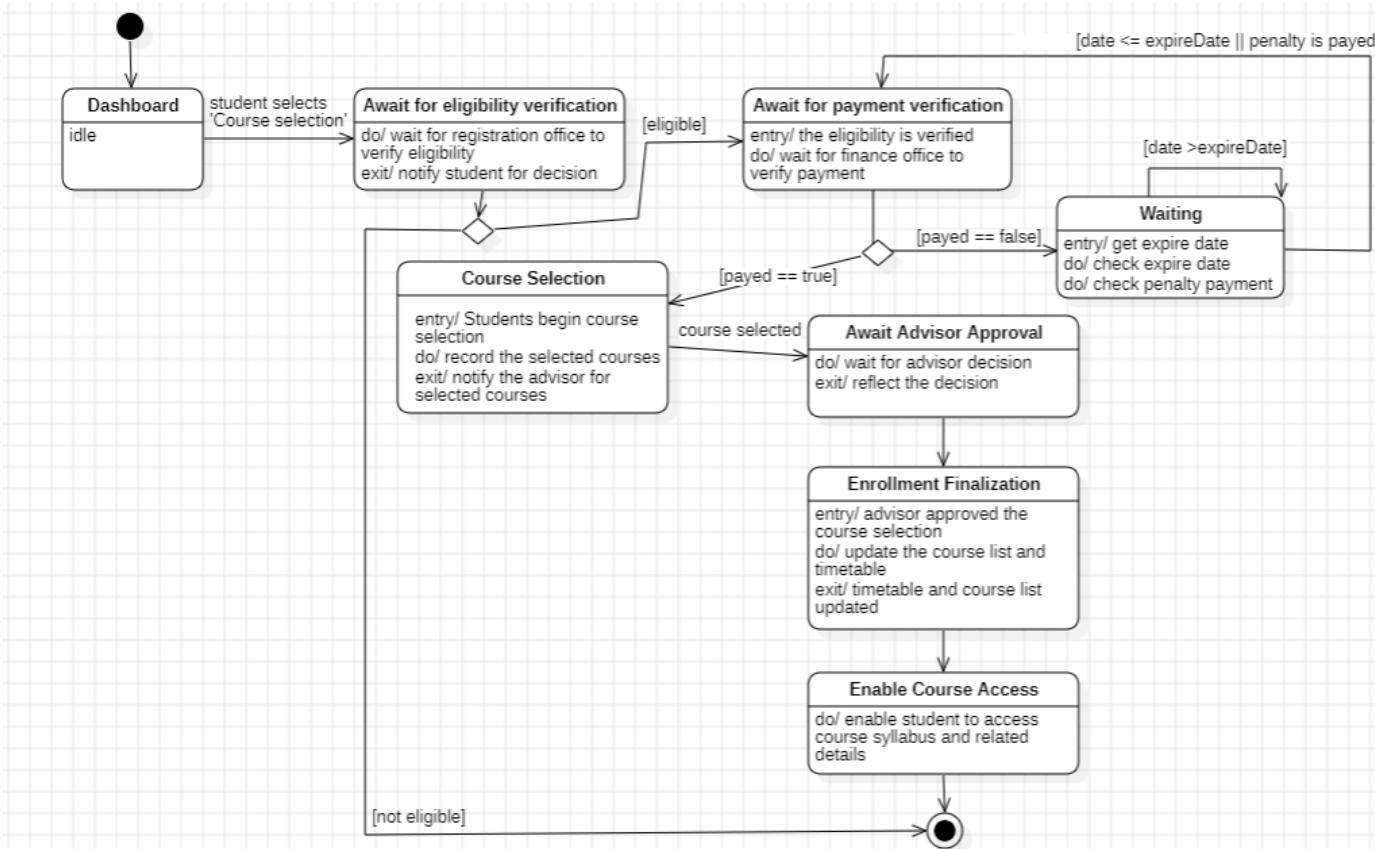
ERD – ThinkLink



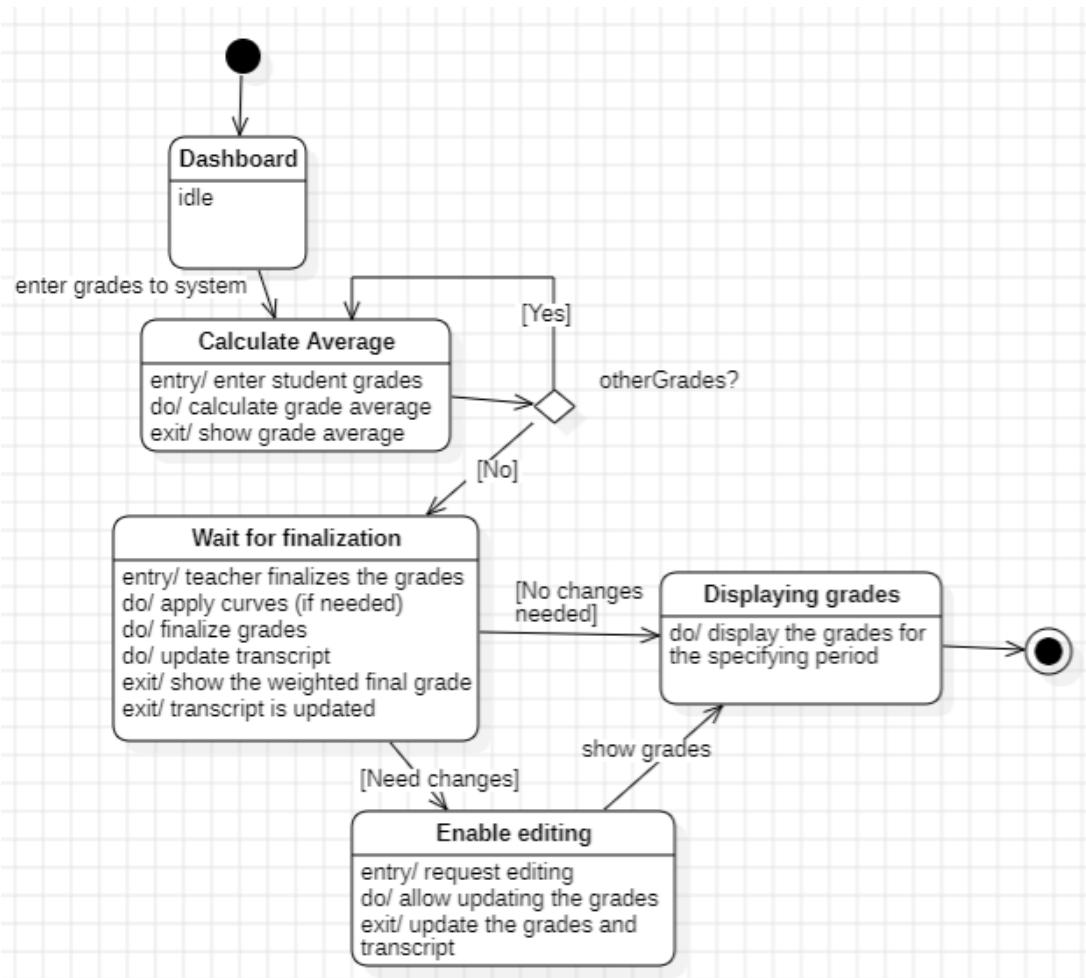
State Machine Diagram – UIS-SD-1



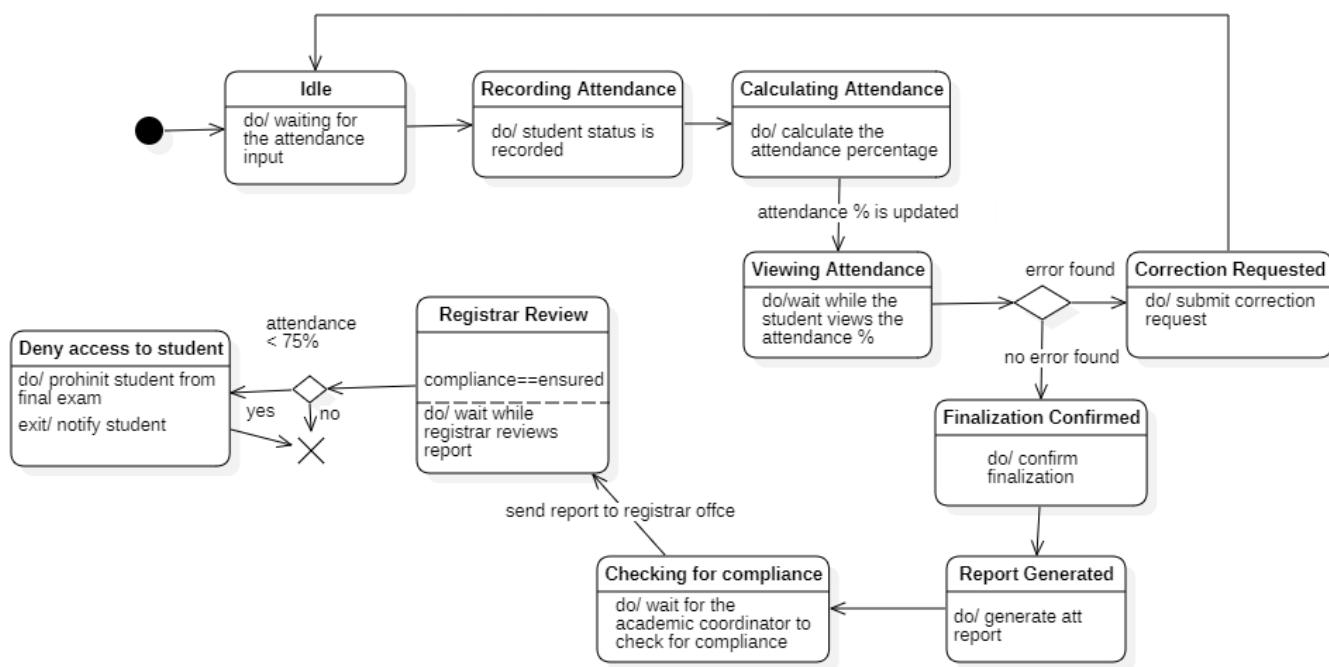
State Diagram – UIS-SD-2



State Diagram – UIS-SD-3

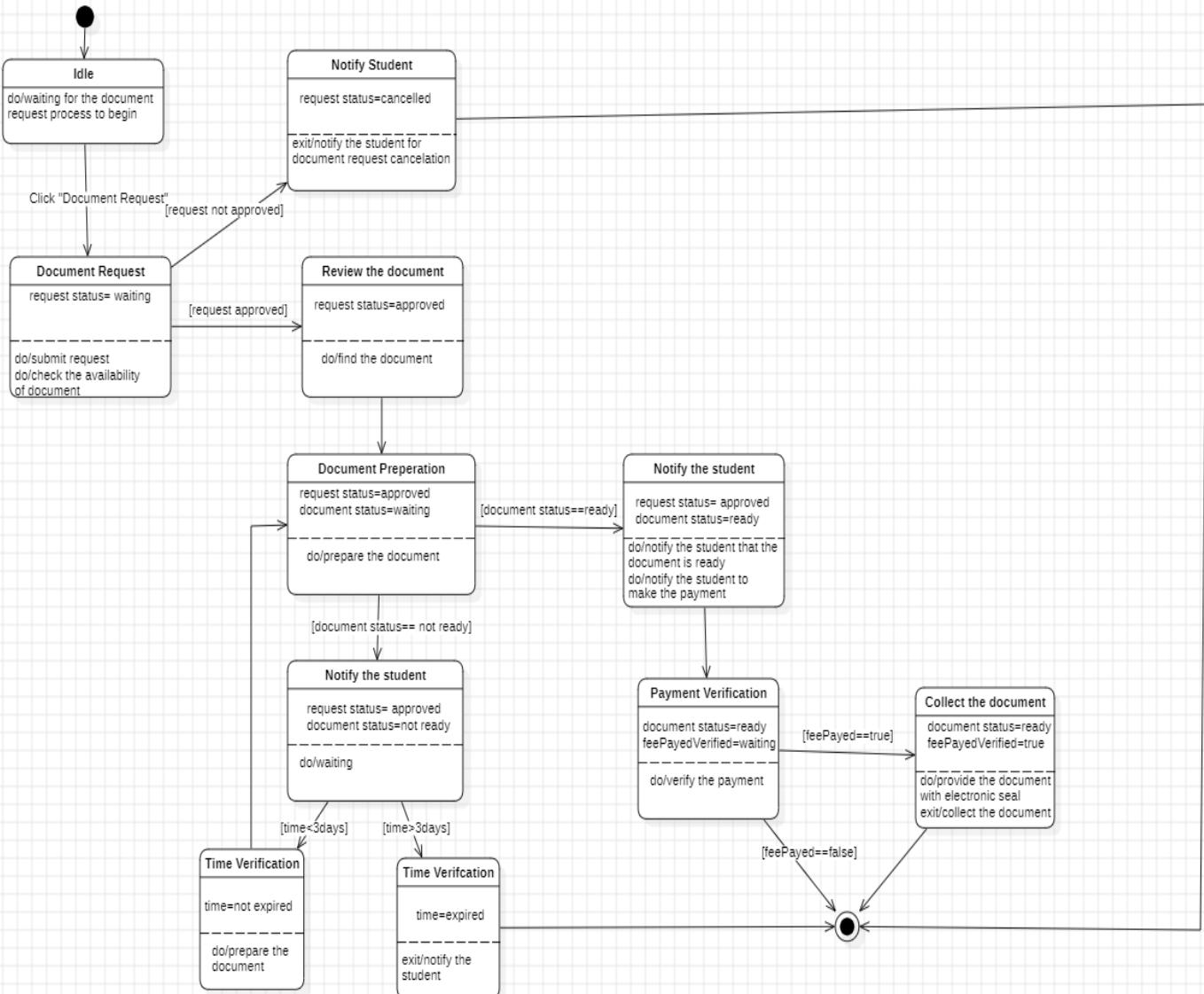


State Diagram – UIS-SD-4



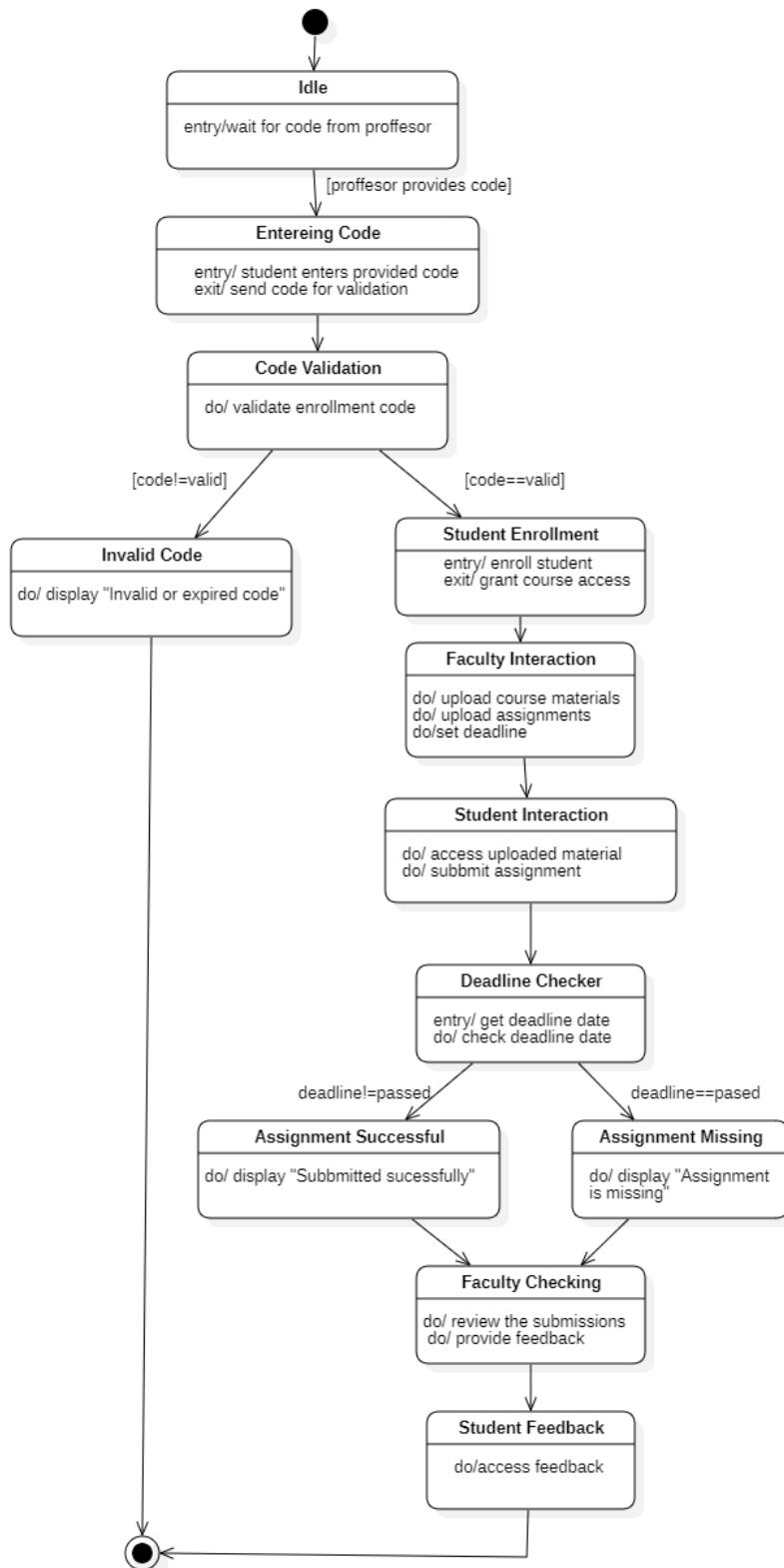
State Diagram – UIS-SD-5

Document Request & Processing

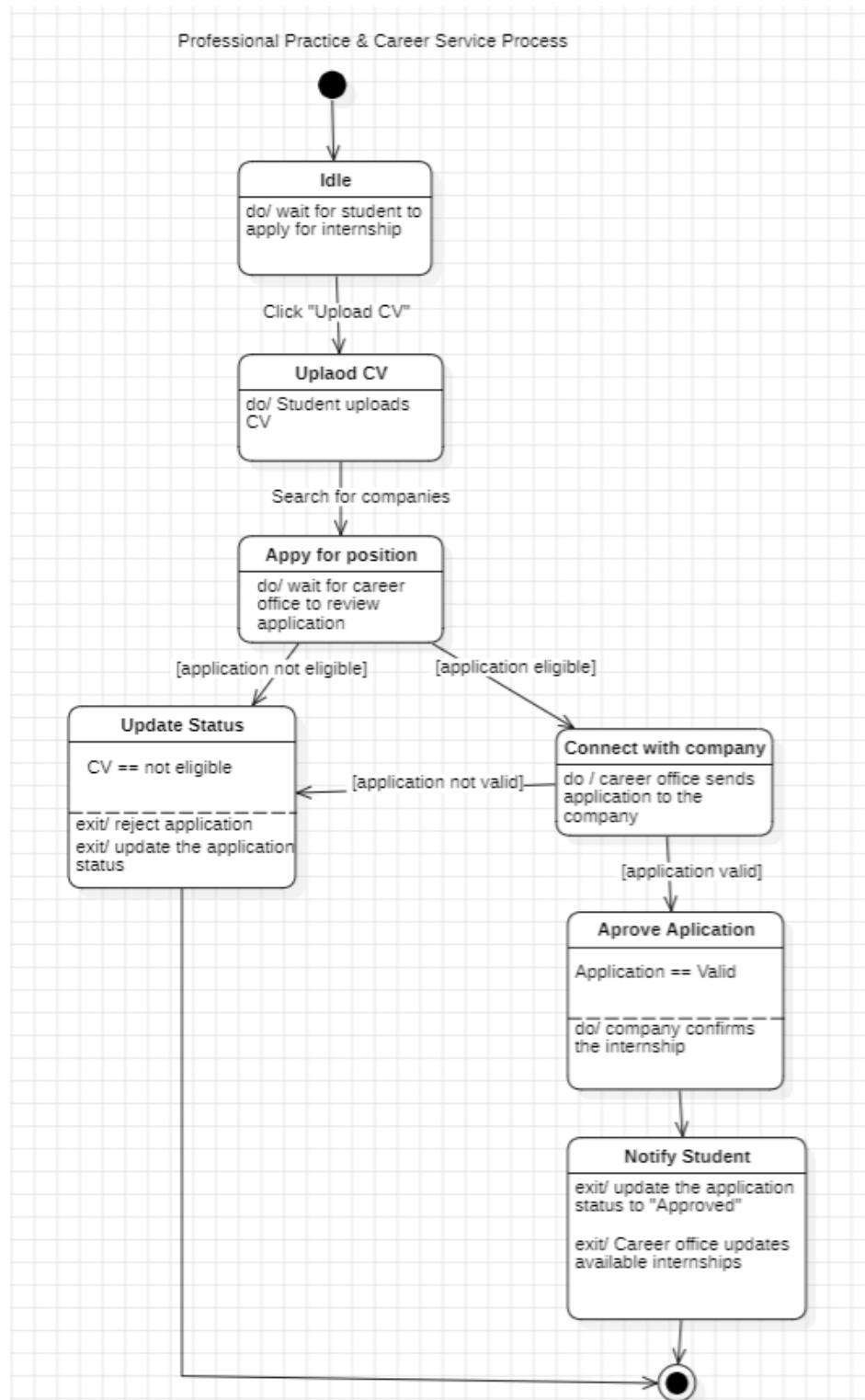


State Diagram – UIS-SD-6

Classroom learning & Management

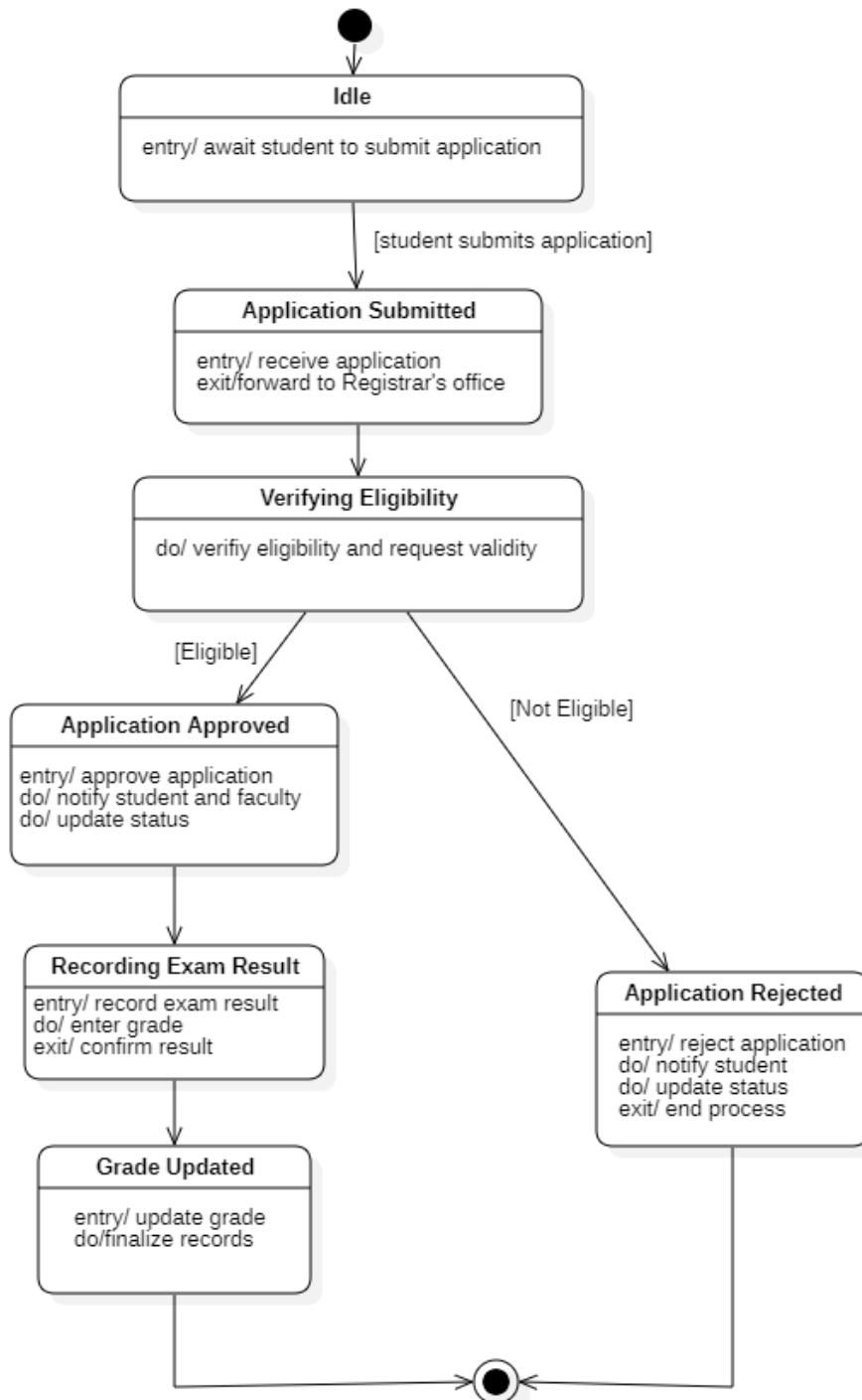


State Diagram – UIS-SD-7

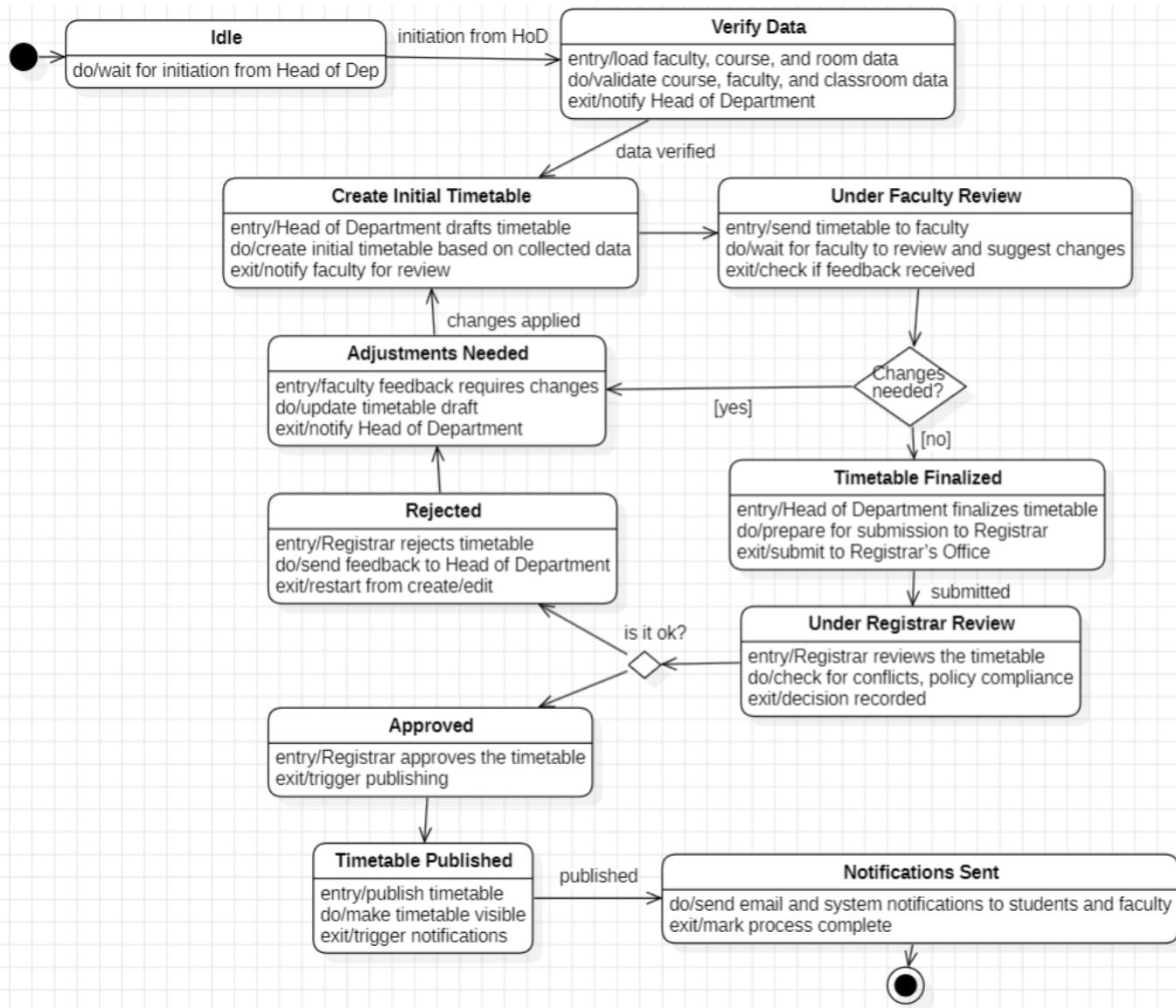


State Diagram – UIS-SD-8

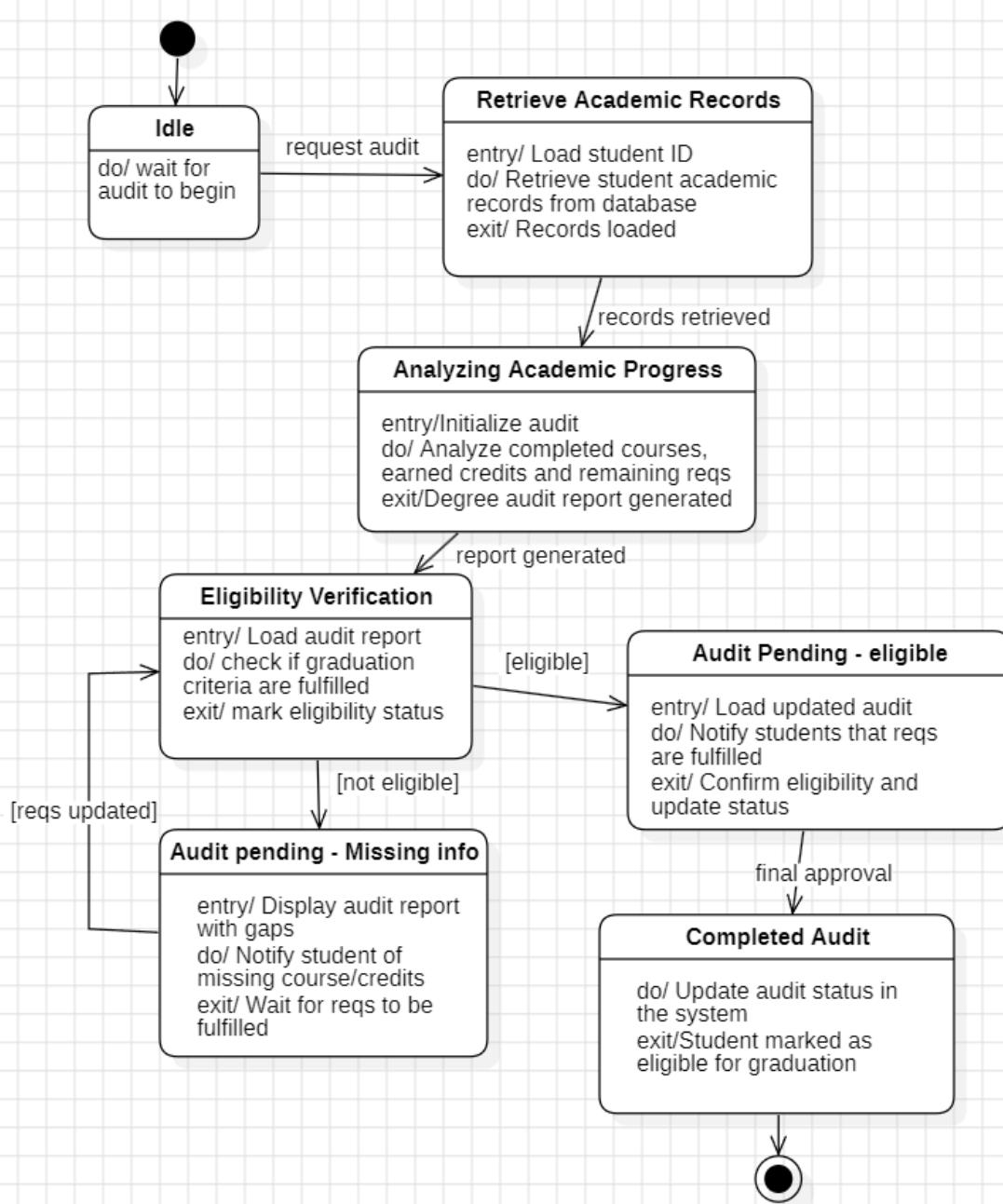
Additional Exam Application



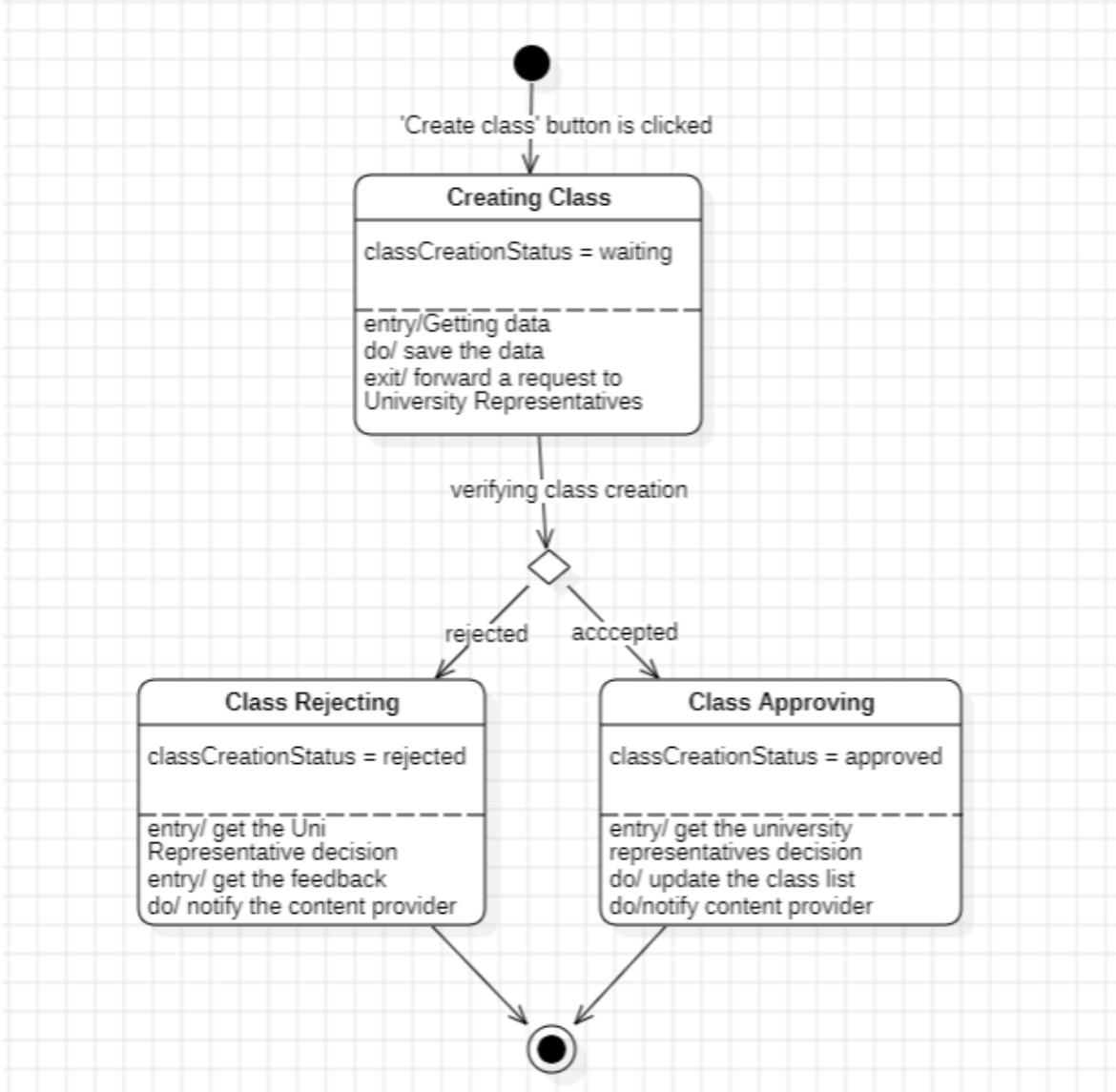
State Diagram – UIS-SD-9



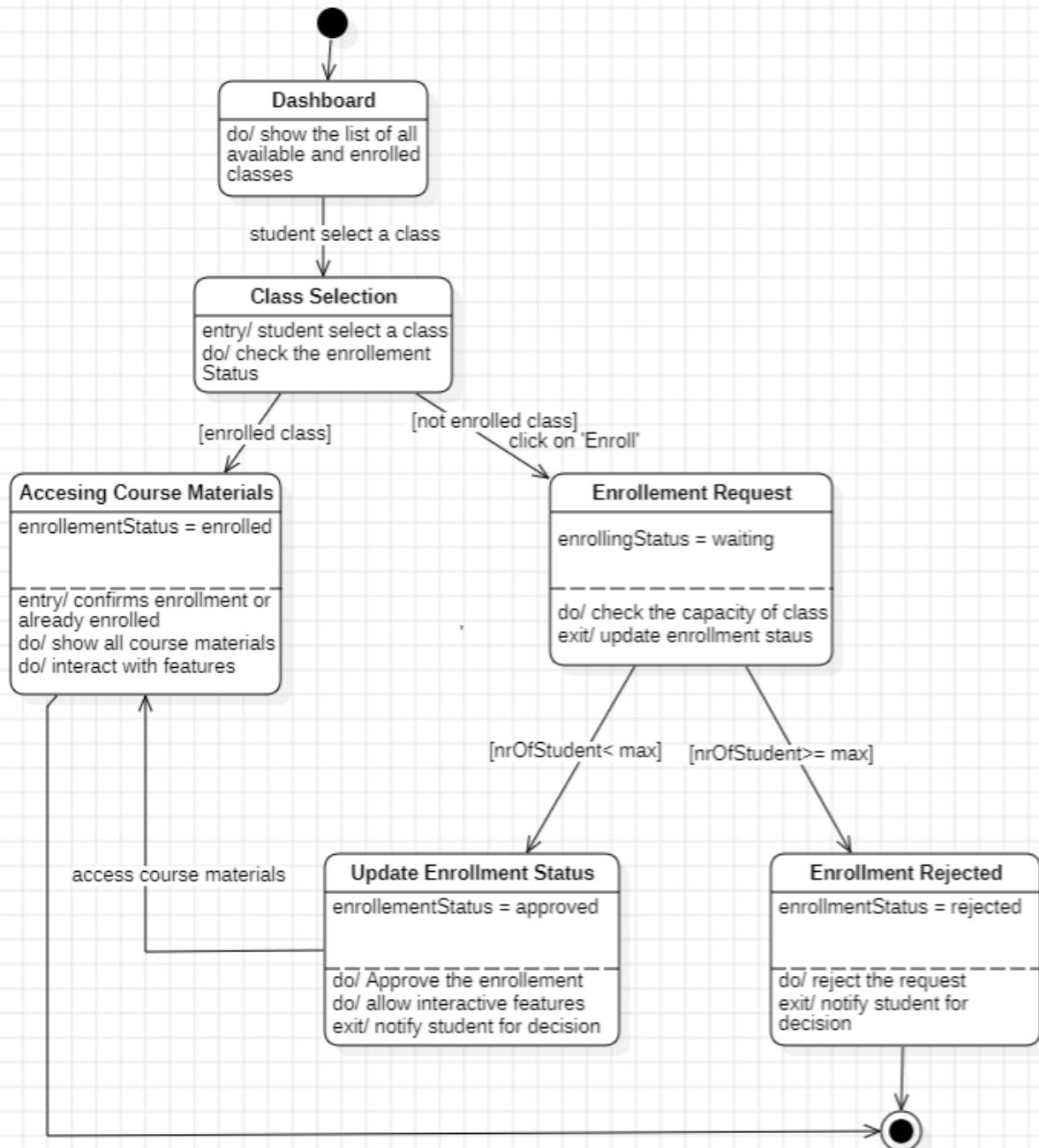
State Diagram – UIS-SD-10



State Diagram – ThinkLink-SD-1

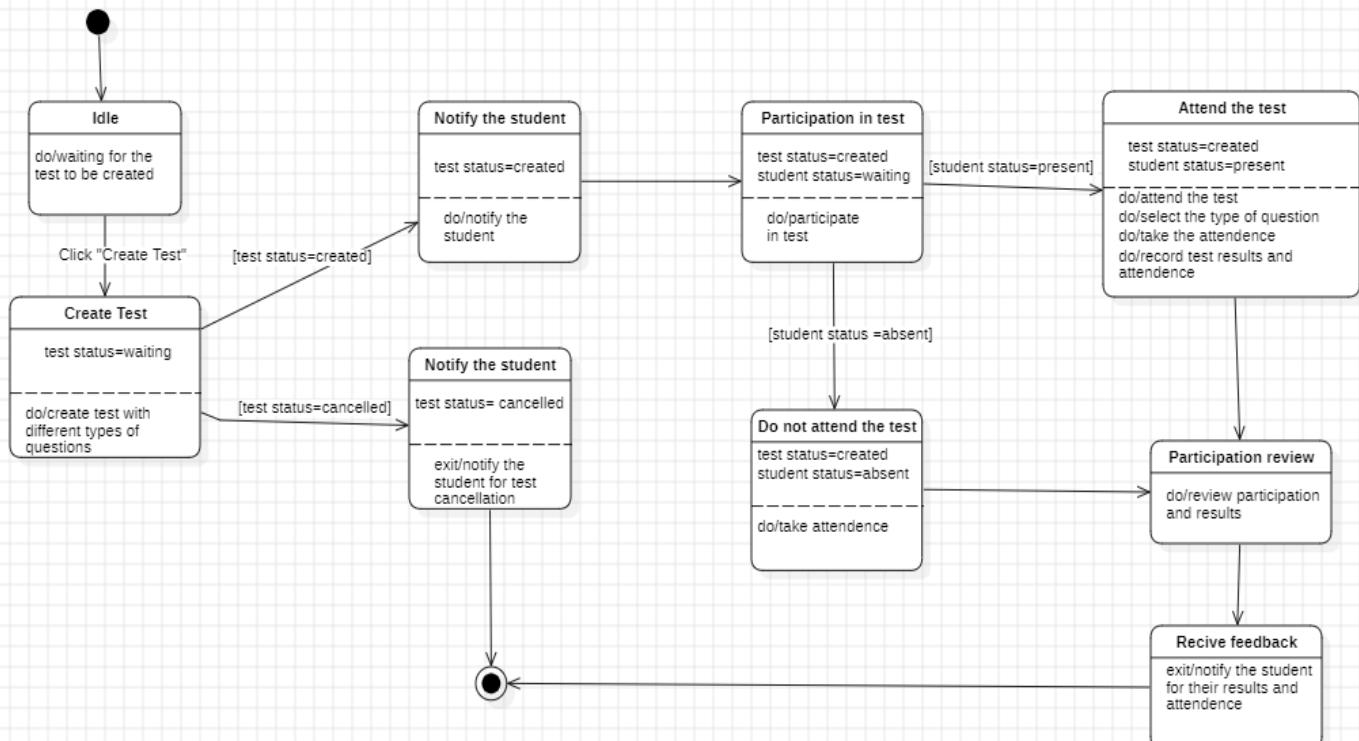


State Diagram – ThinkLink-SD-2

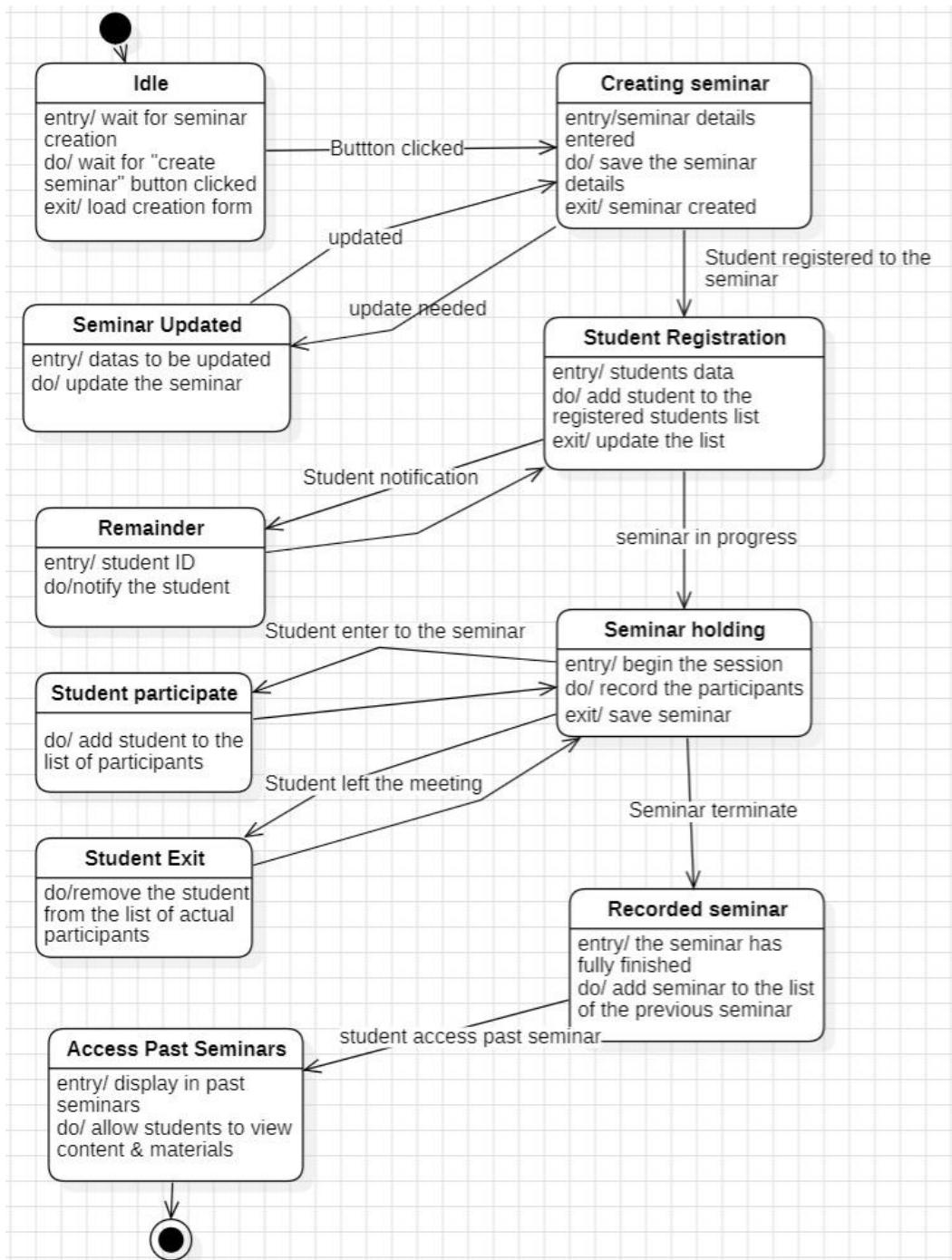


State Diagram – ThinkLink-SD-3

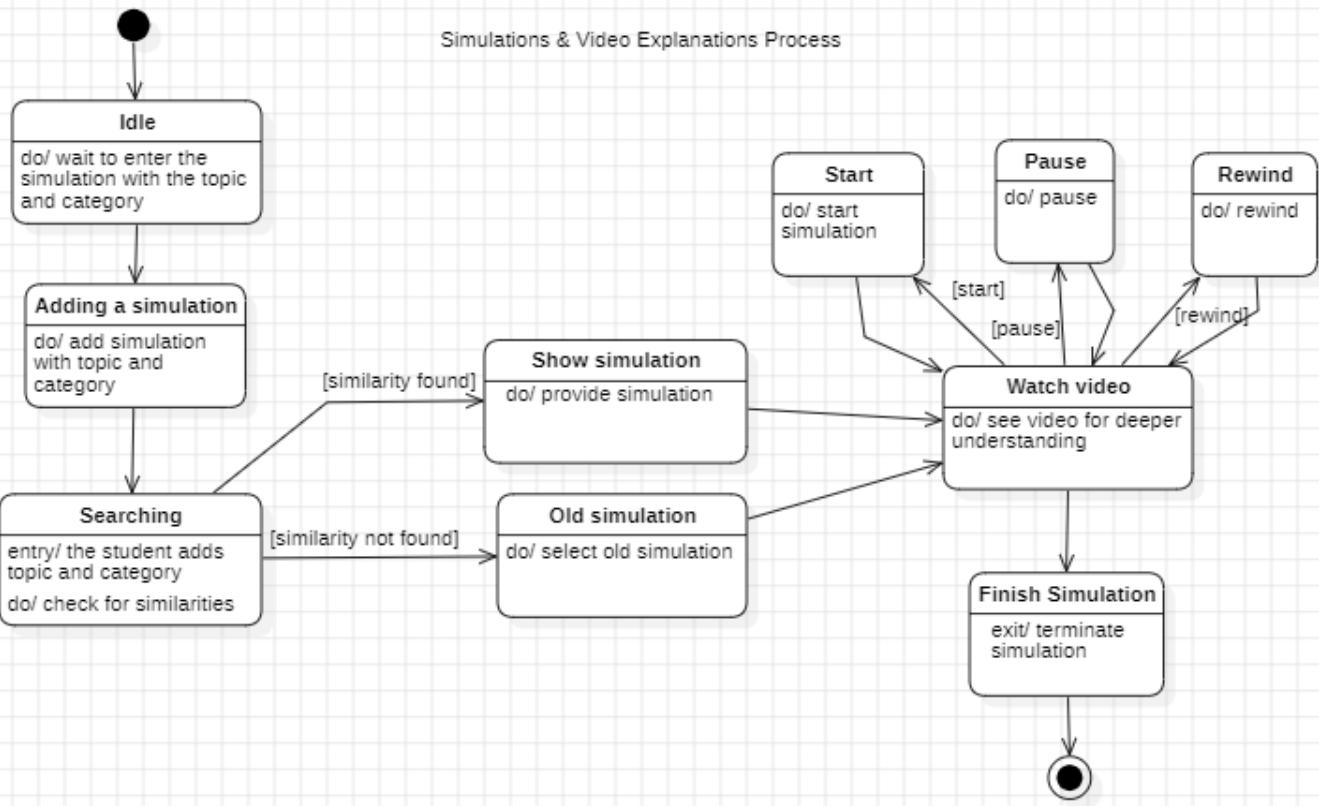
Test & Seminar Participation



State diagram – ThinkLink-SD-4

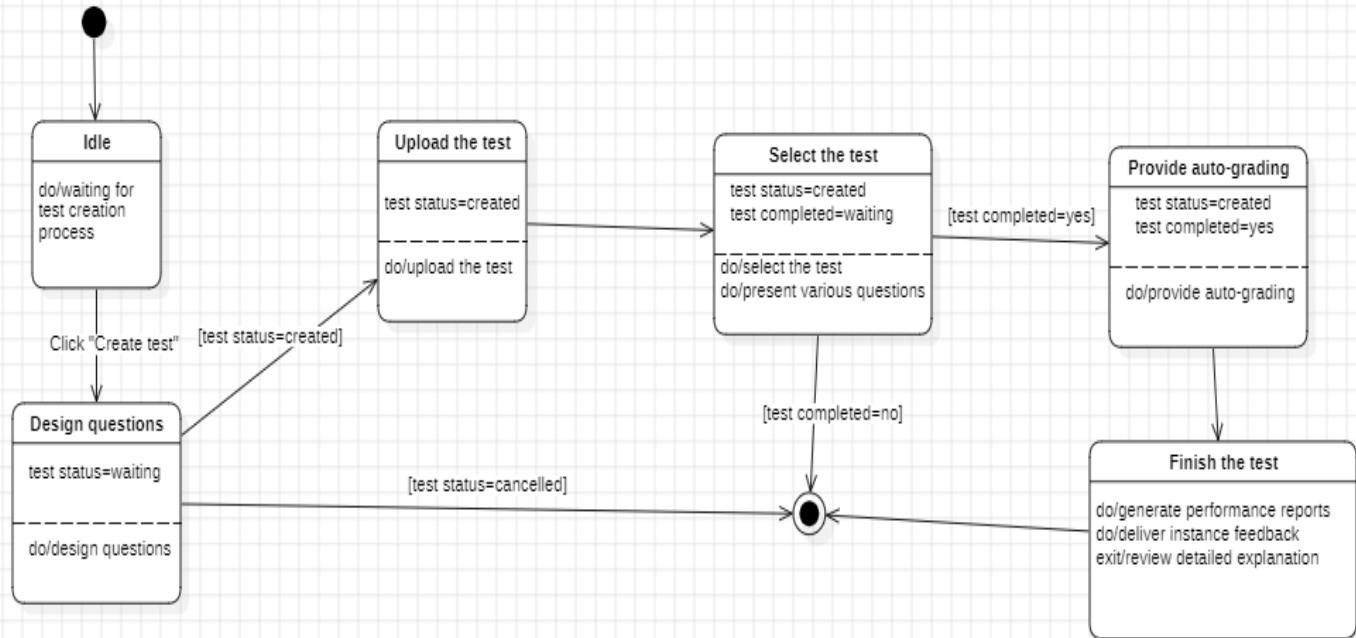


State Diagram – ThinkLink-SD-5

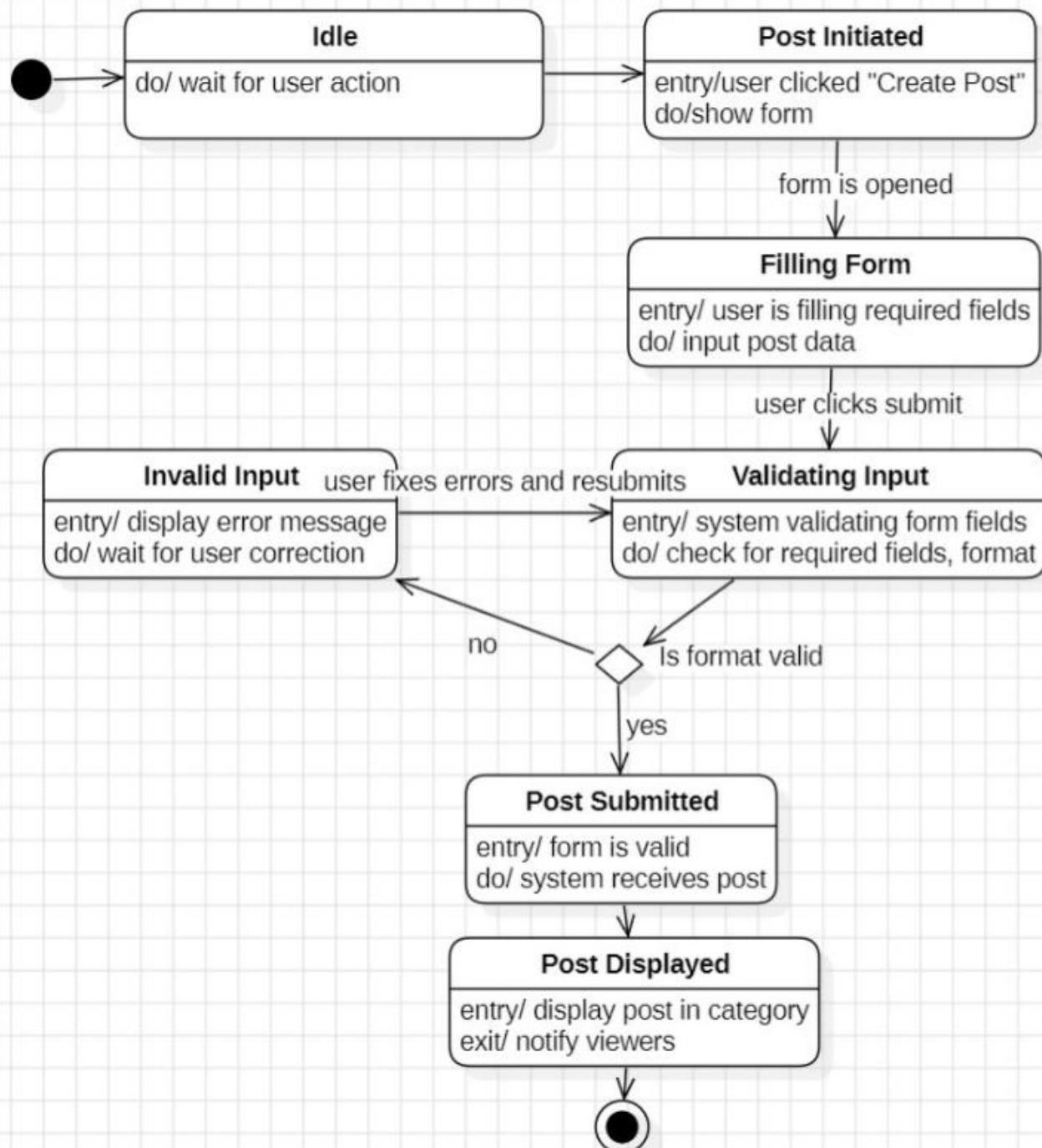


State Diagram – ThinkLink-SD-6

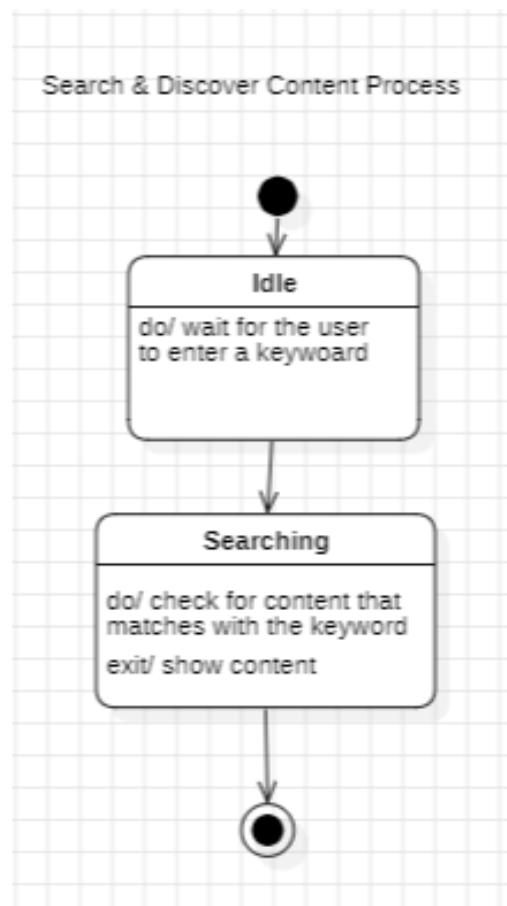
Practice Test and Quizzes



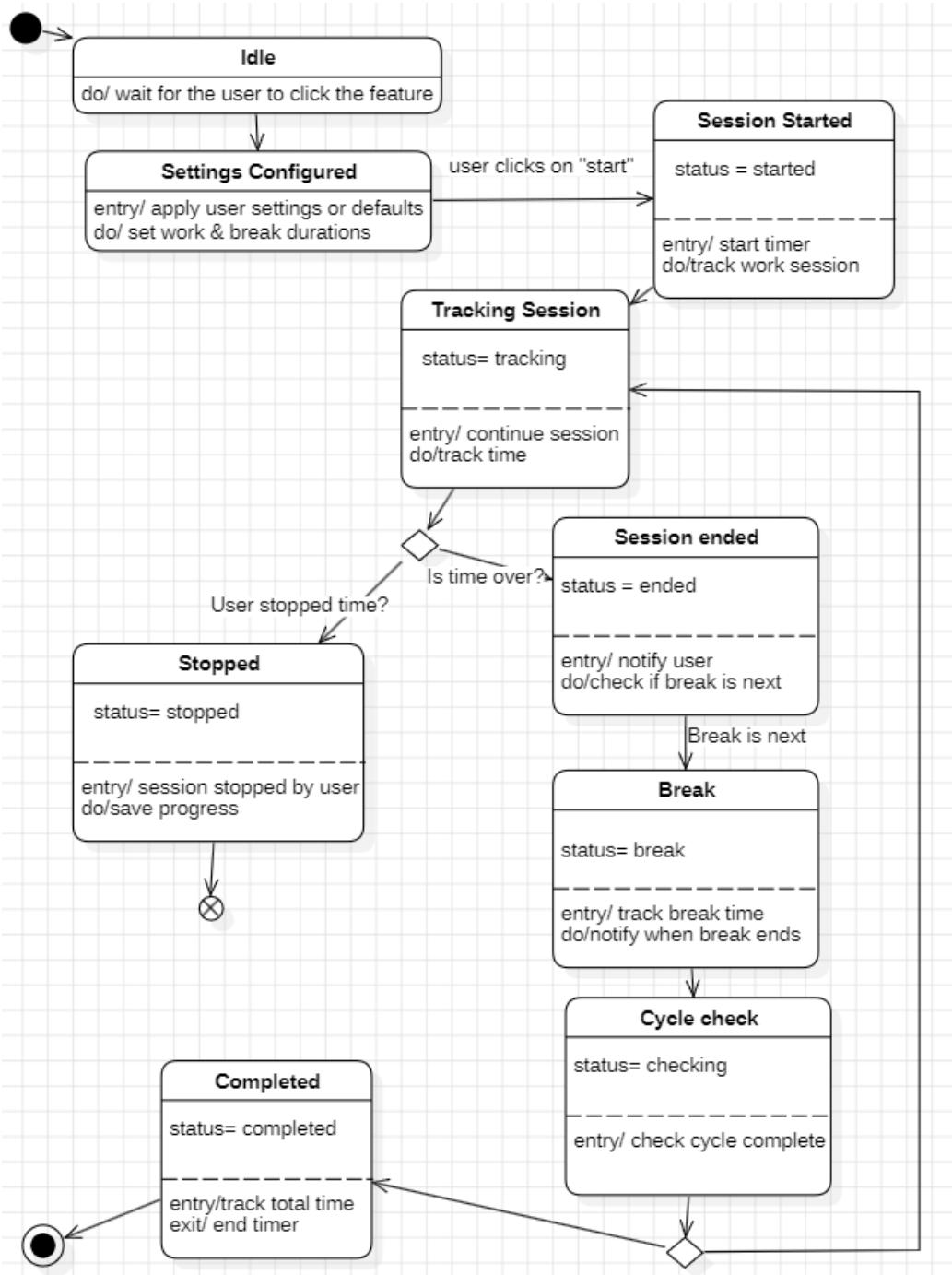
State Diagram – ThinkLink-SD-7



State Diagram – ThinkLink-SD-9

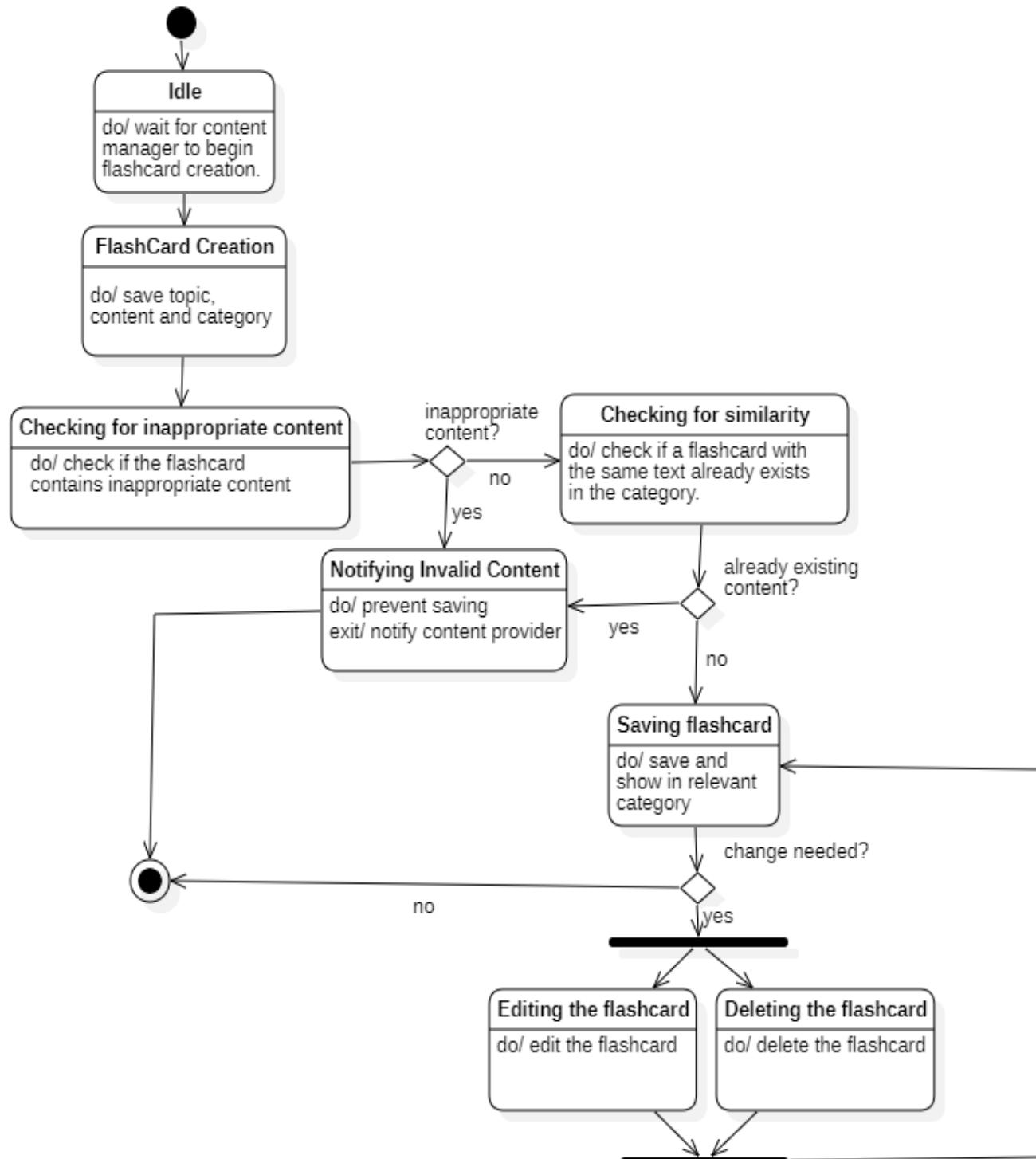


State Diagram – ThinkLink-SD-10

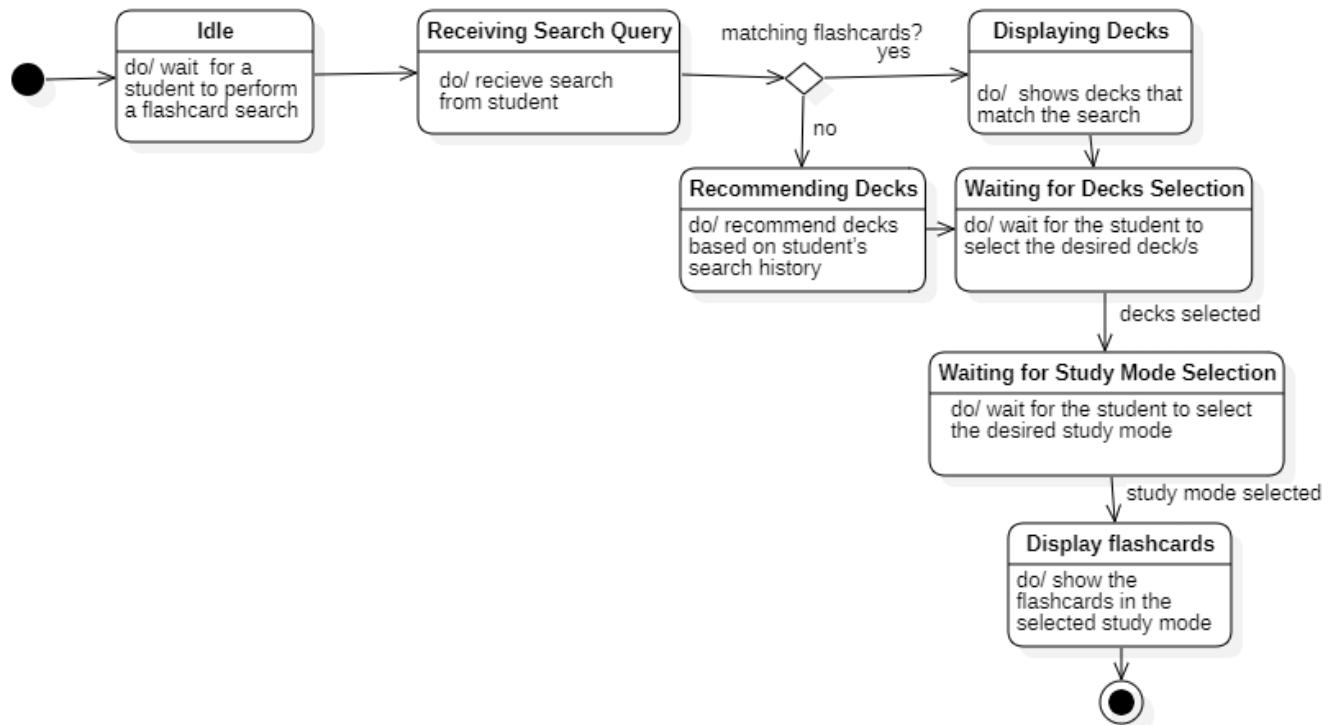


State Diagram – ThinkLink-SD-12

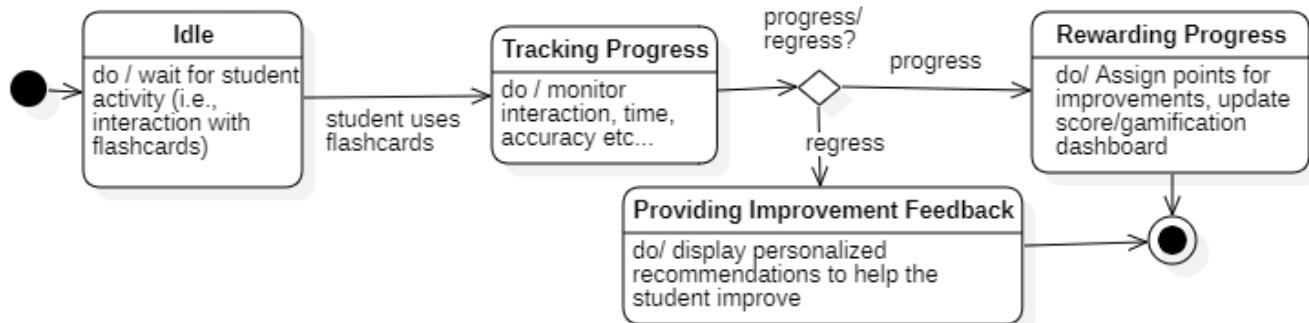
Flashcard Creation & Management



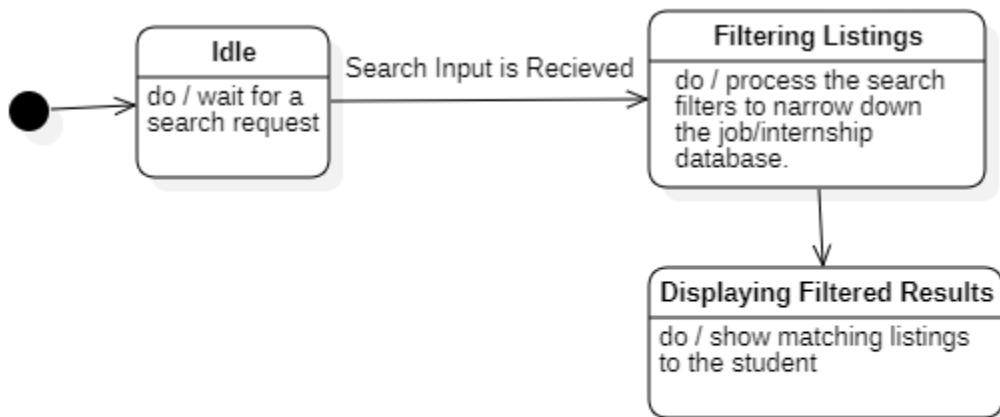
State Diagram – ThinkLink-SD-13



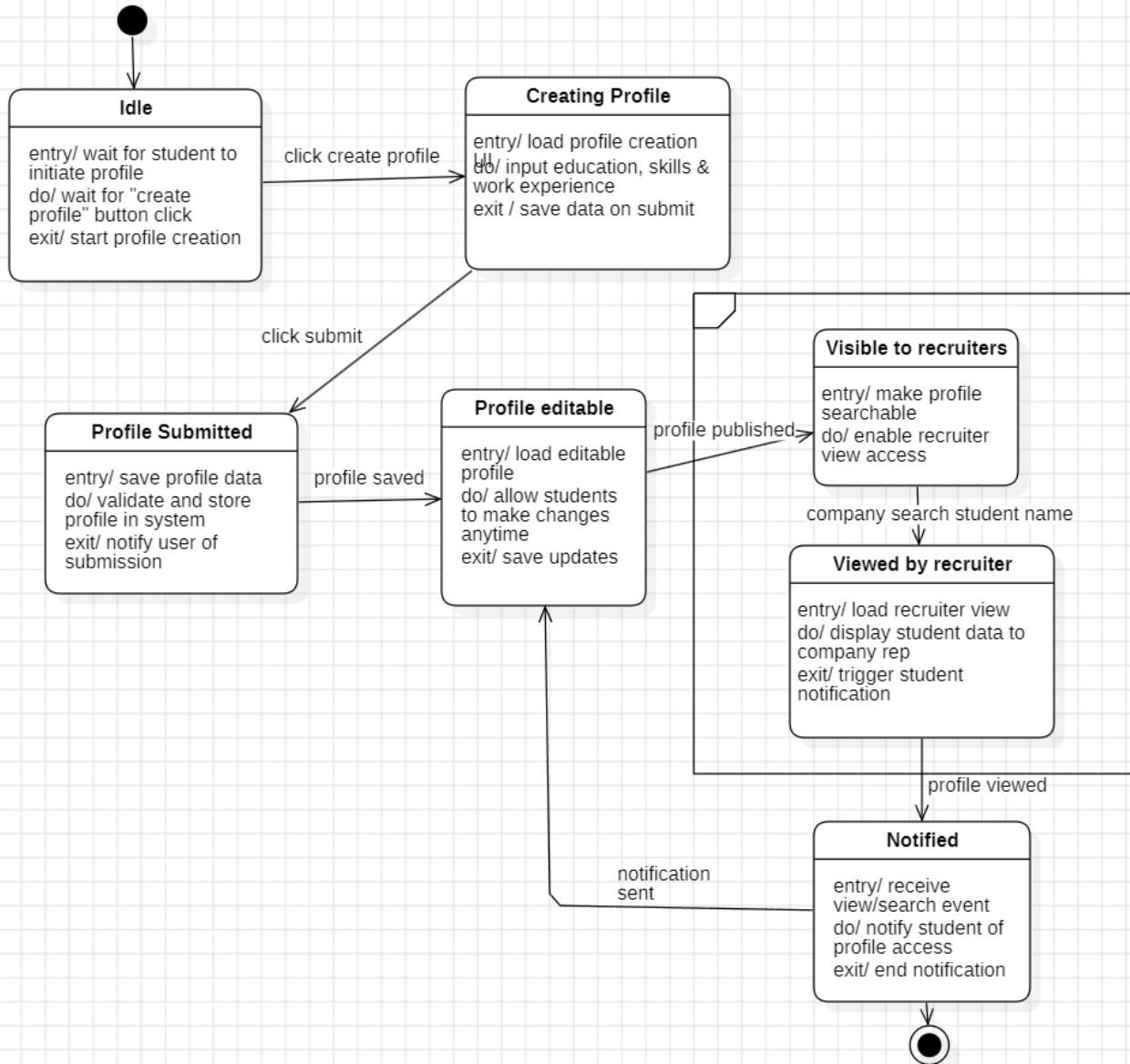
State Diagram – ThinkLink-SD-14



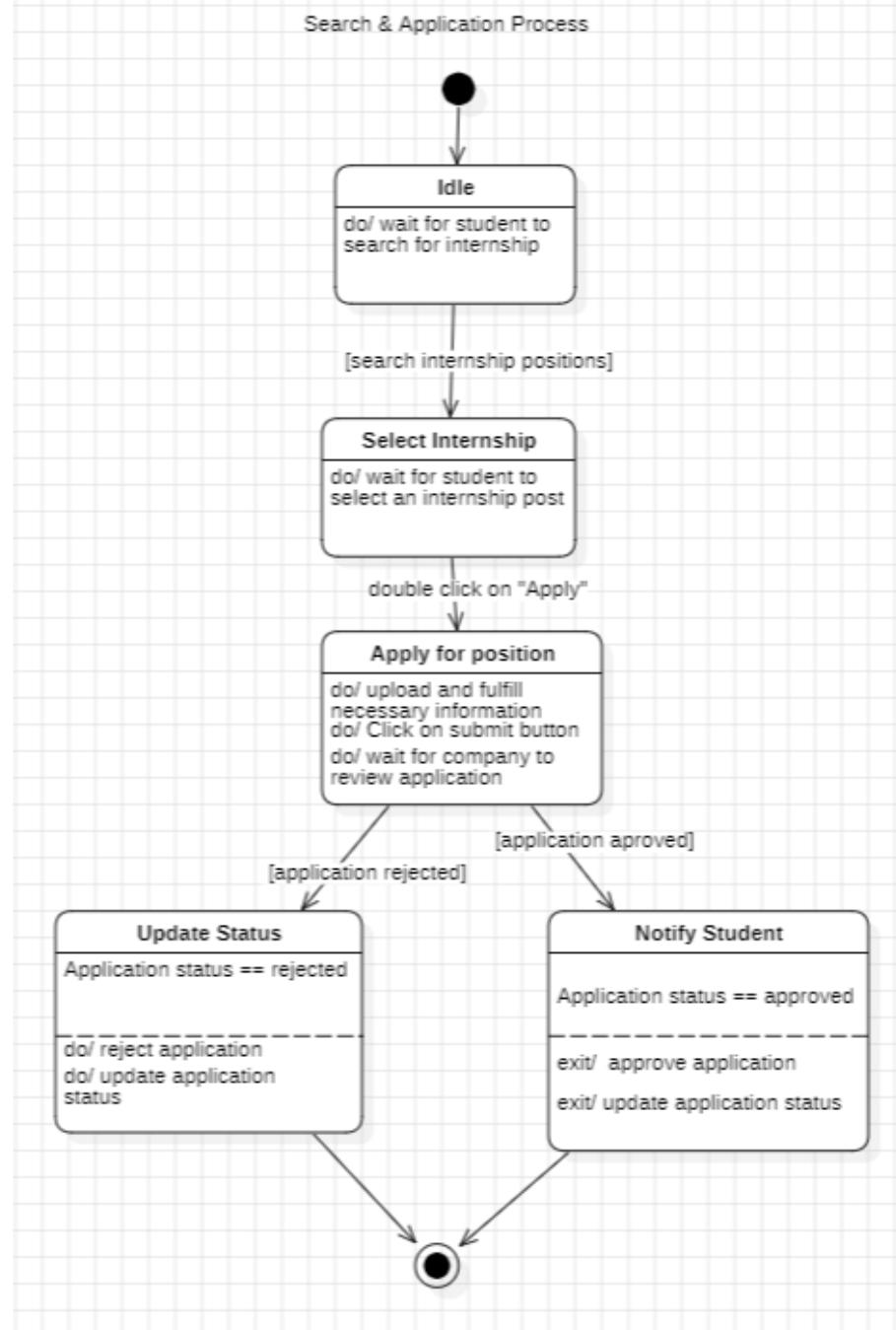
State Diagram – ThinkLink-SD-15



State Diagram – ThinkLink-SD-16

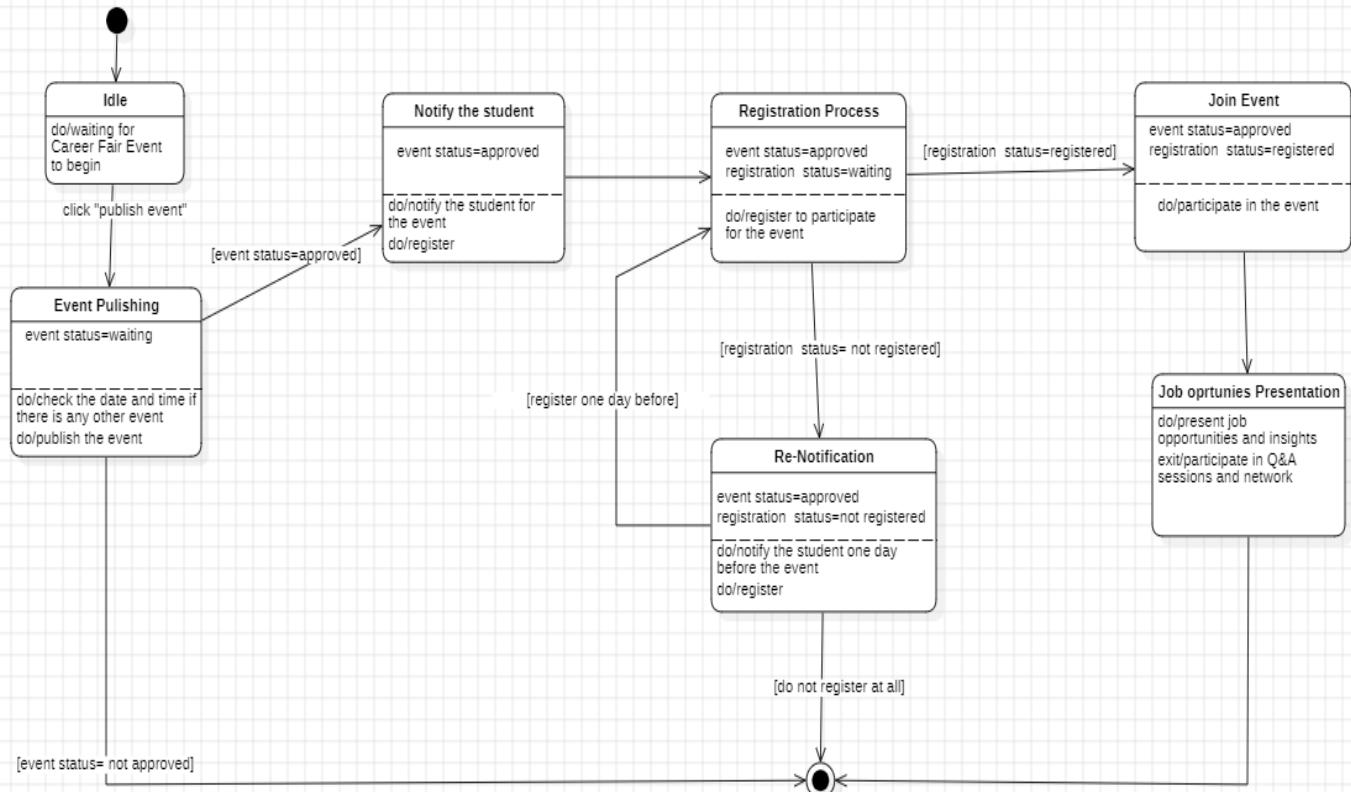


State Diagram – ThinkLink-SD-17

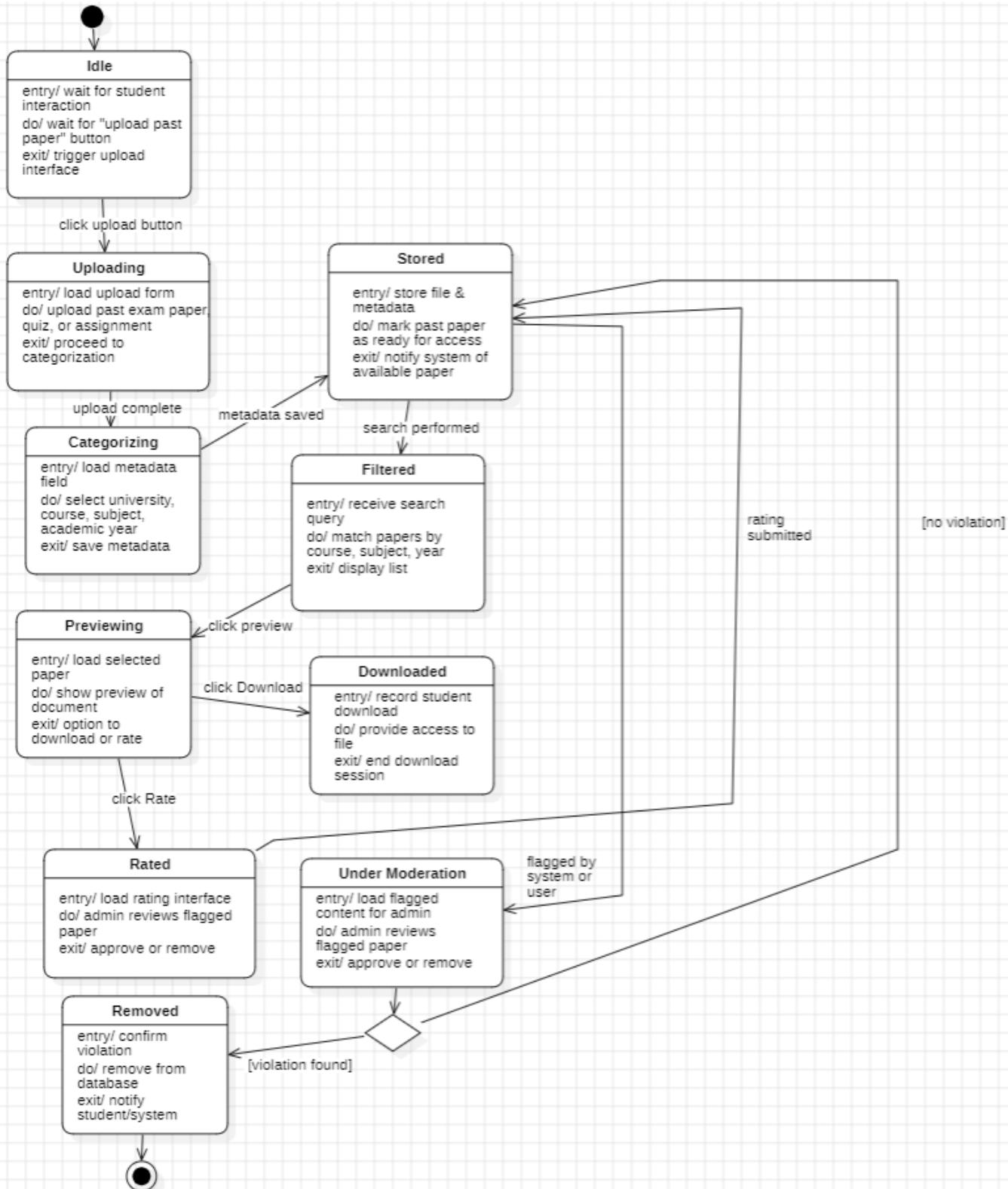


State Diagram – ThinkLink-SD-18

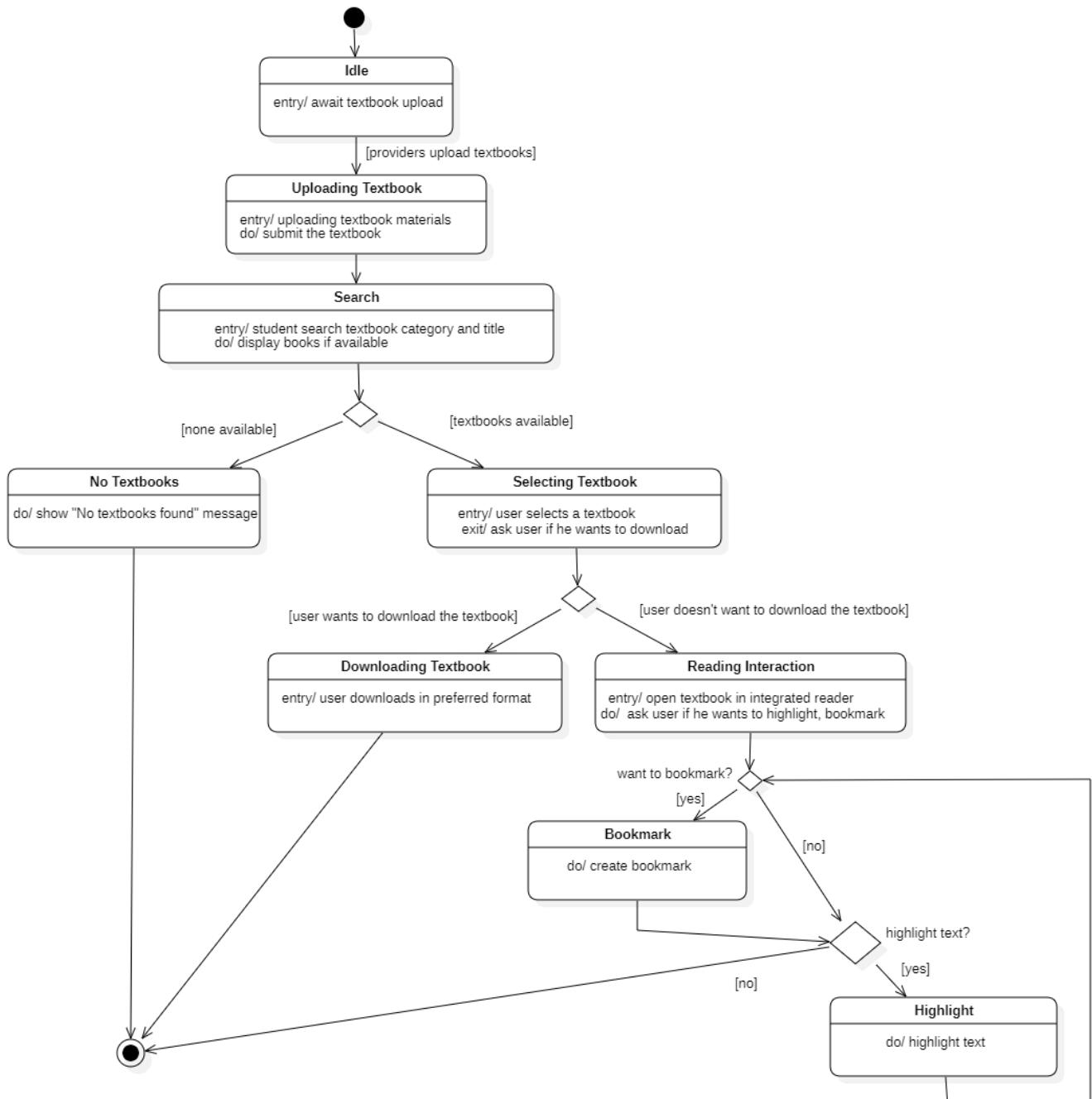
Virtual Career Fair & Events



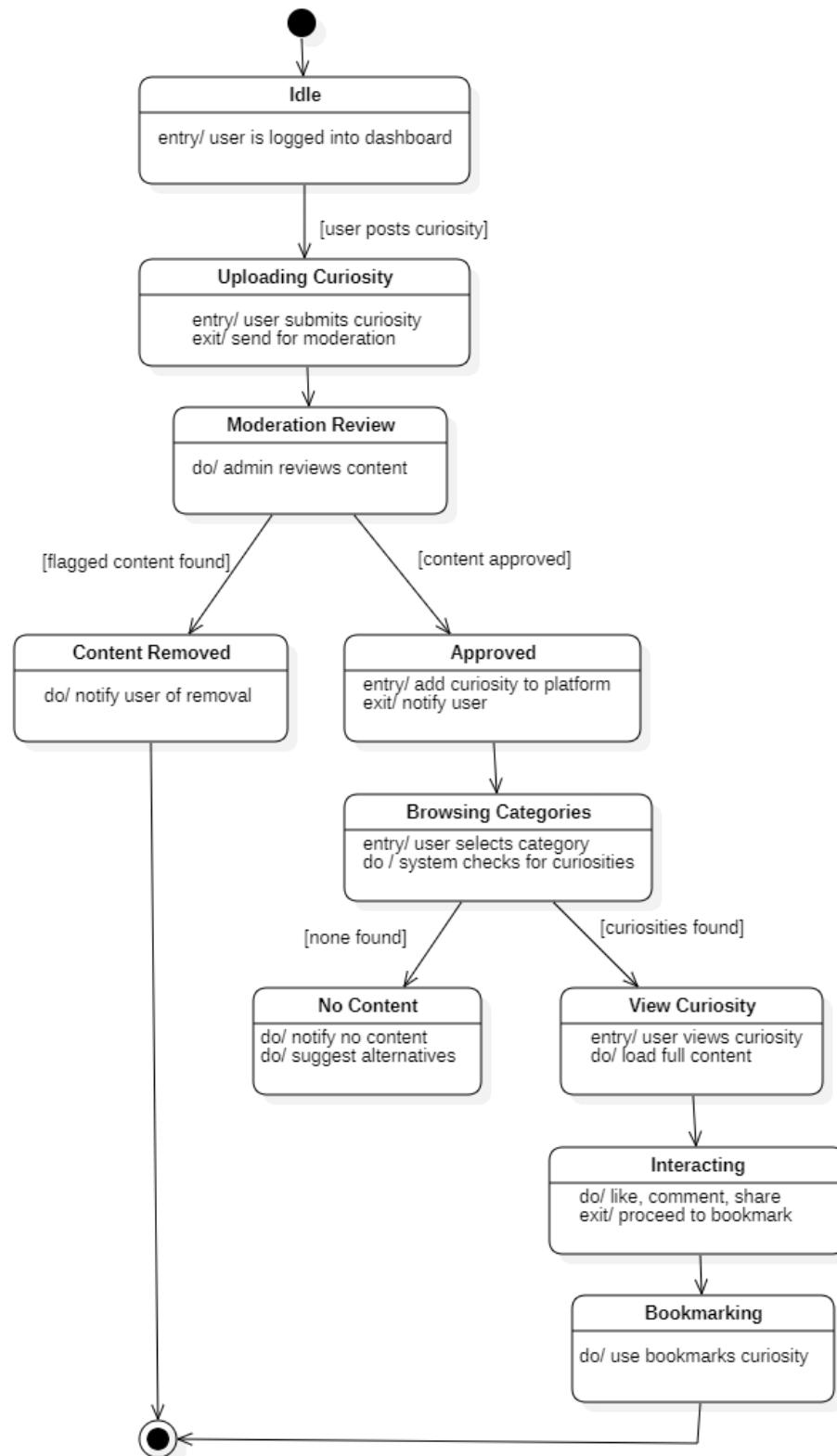
State Diagram – ThinkLink-SD-19



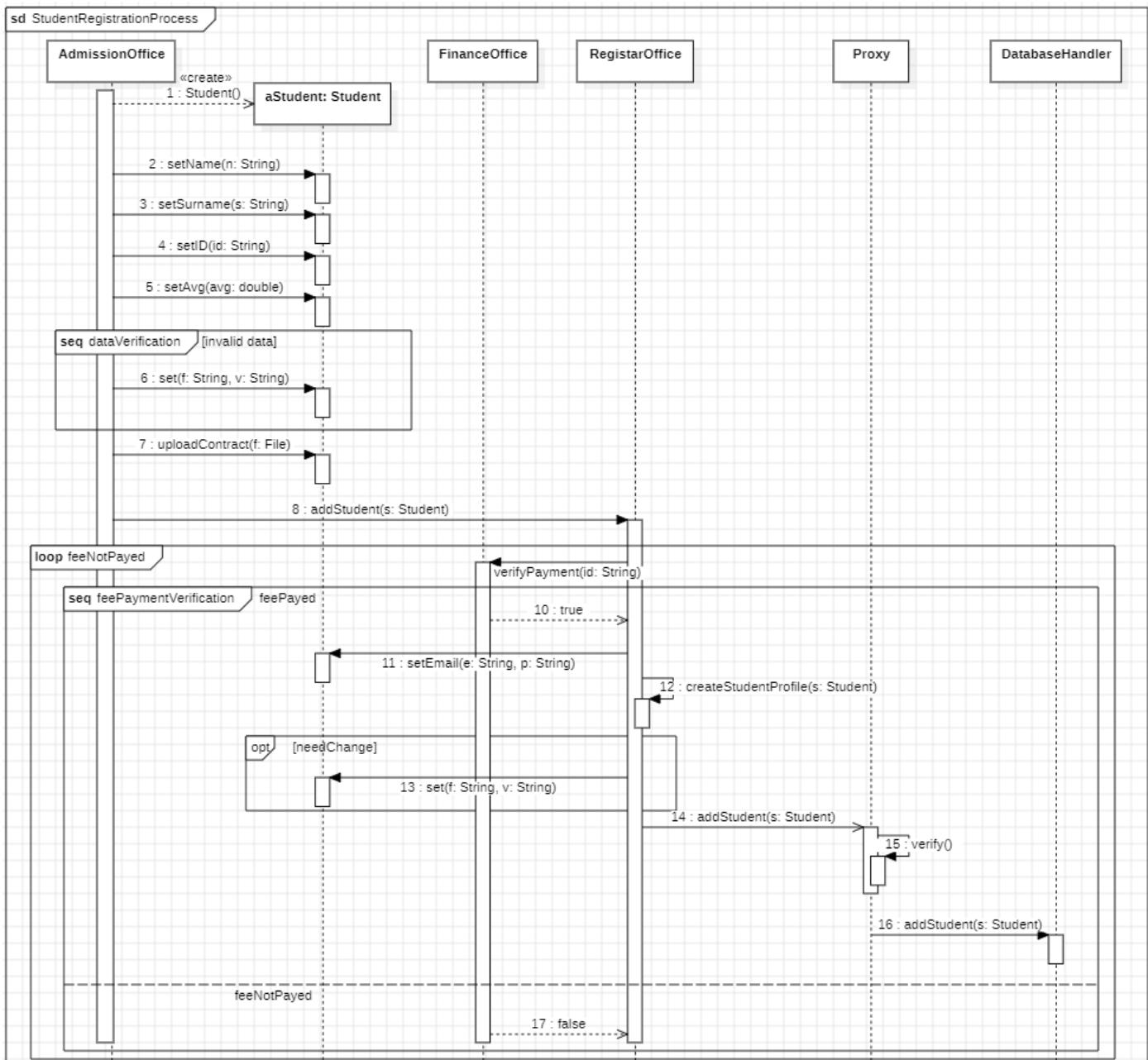
State Diagram – ThinkLink-SD-20



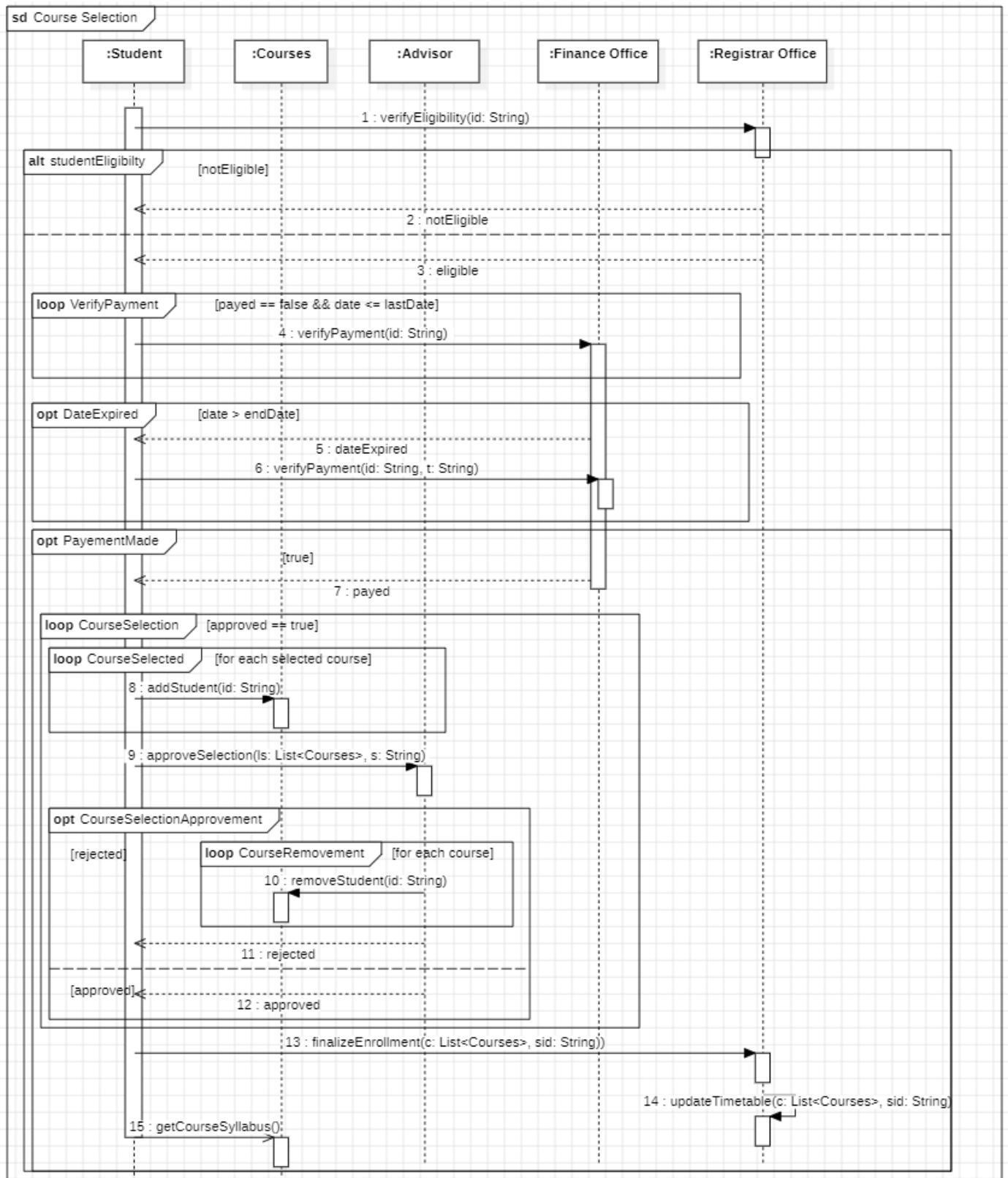
State Diagram – ThinkLink-SD-21



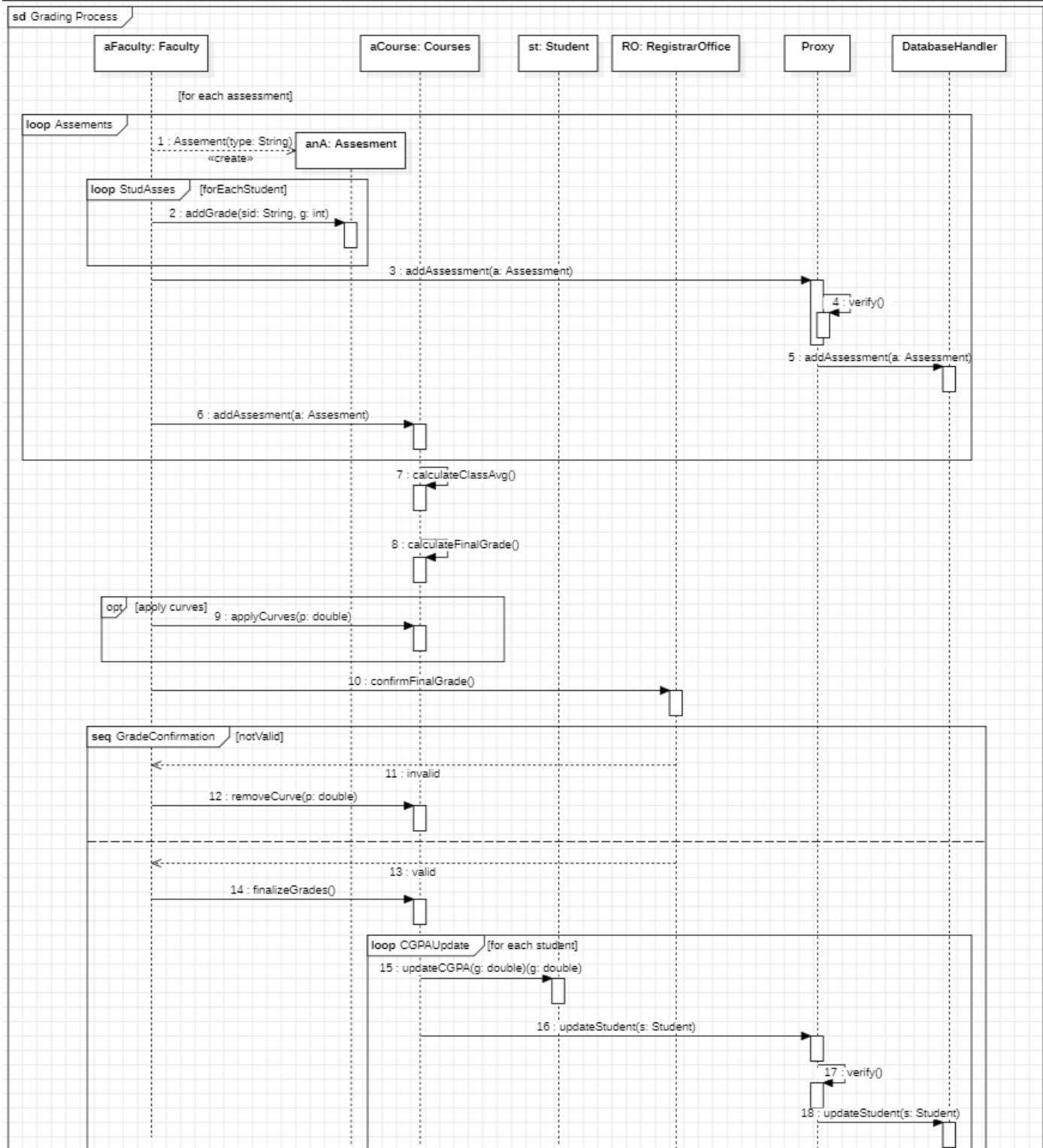
Sequence Diagram – UIS-SeD-1



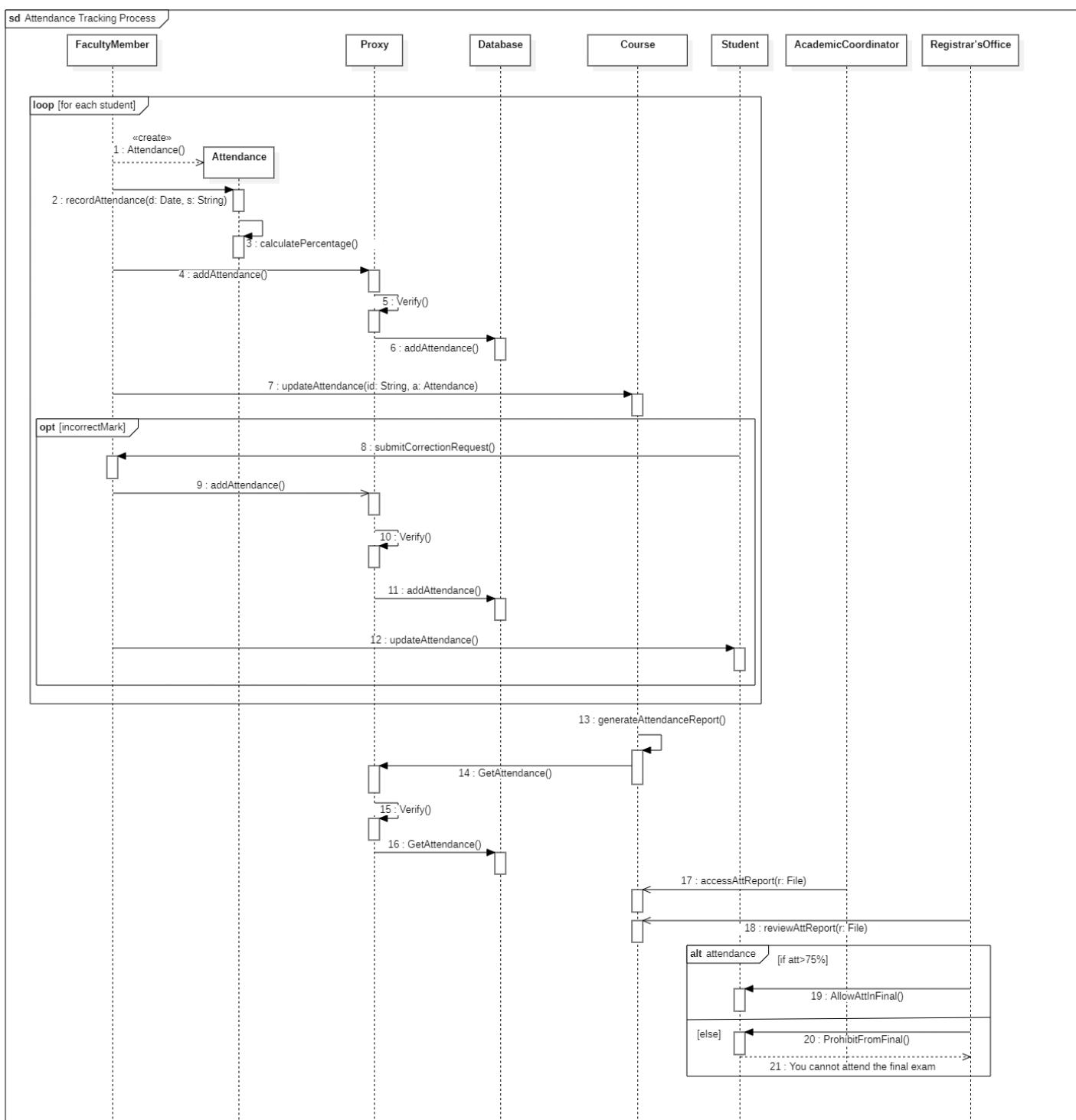
Sequence Diagram – UIS-SeD-2



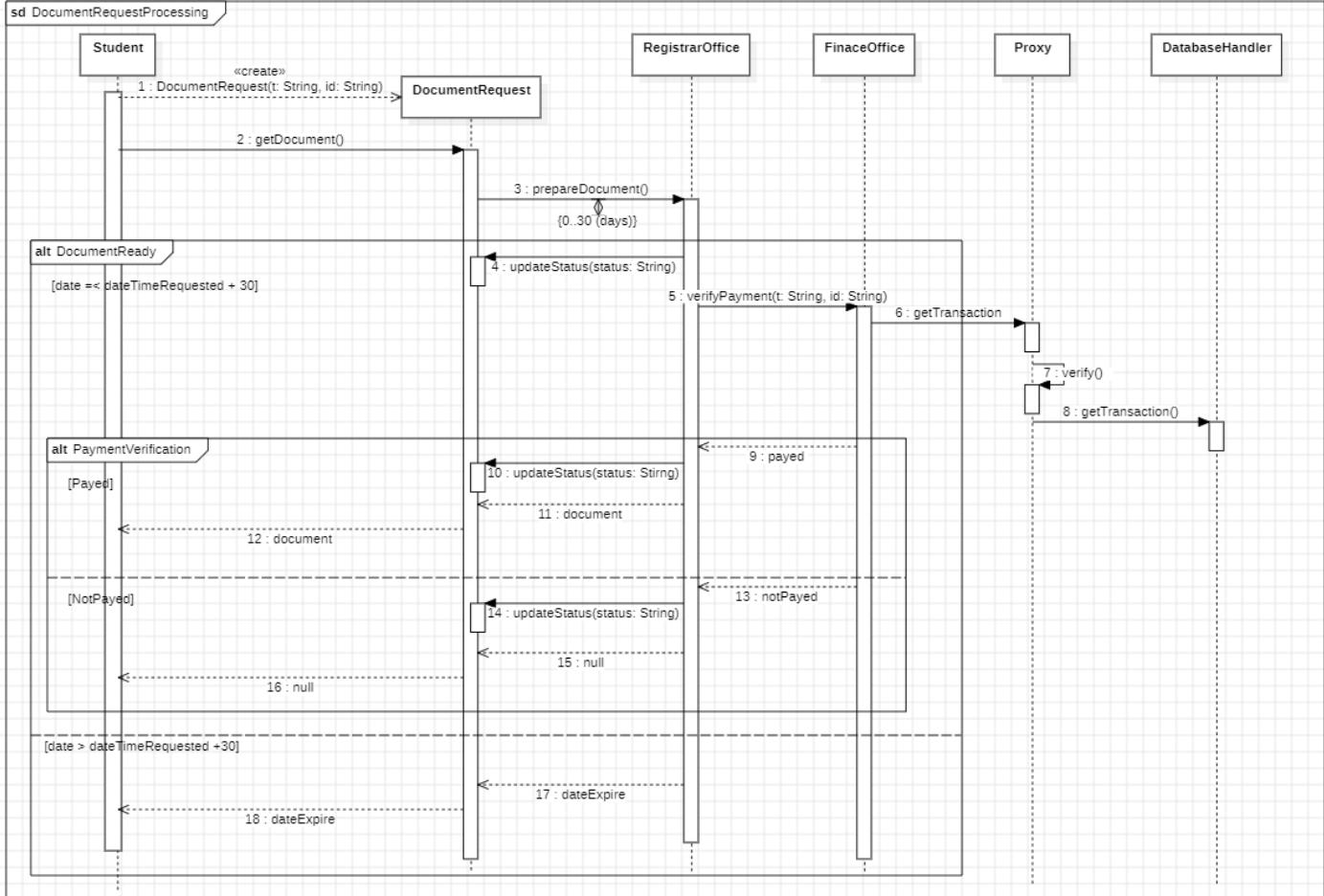
Sequence Diagram – UIS-SeD-3



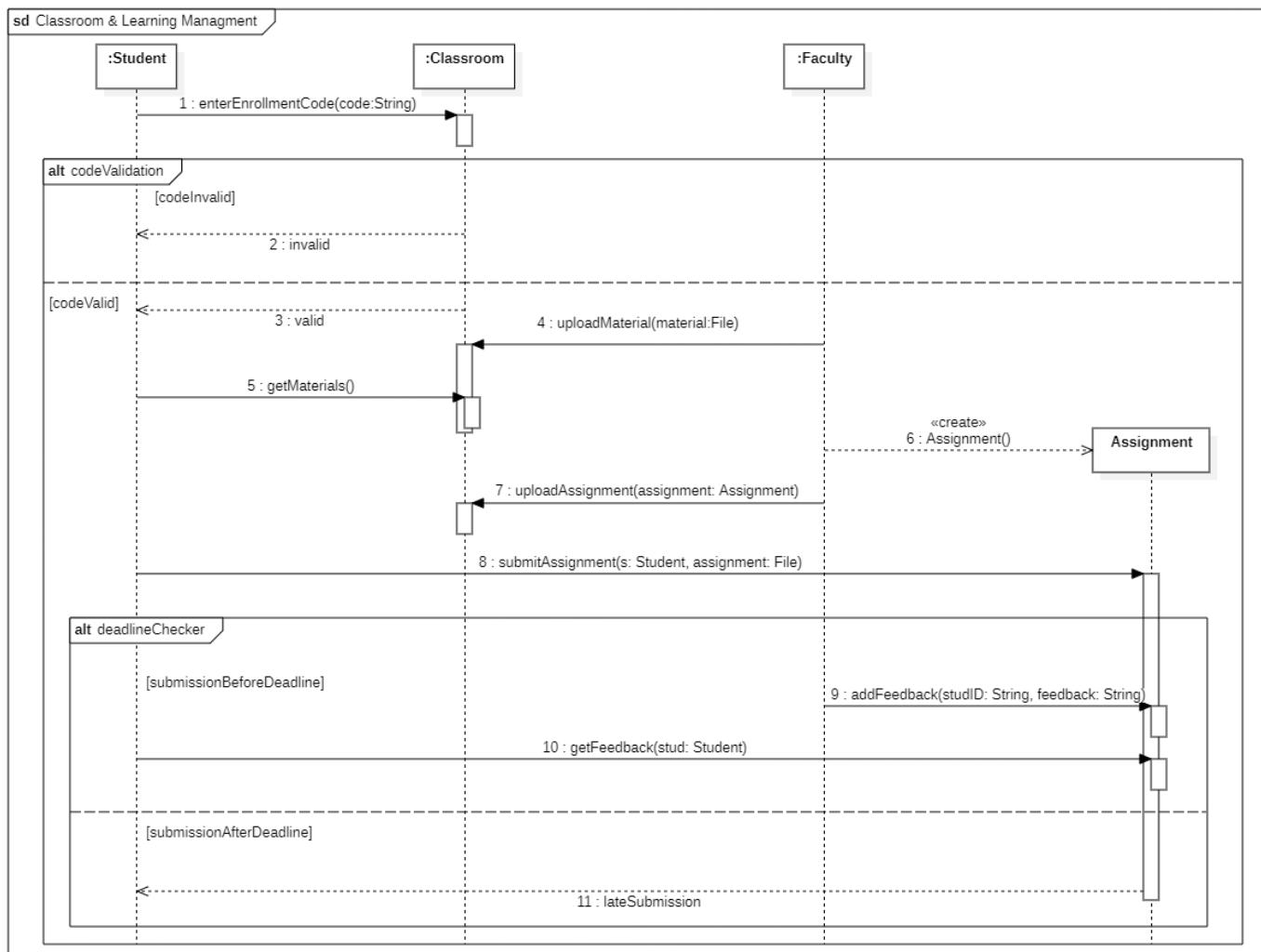
Sequence Diagram – UIS-SeD-4



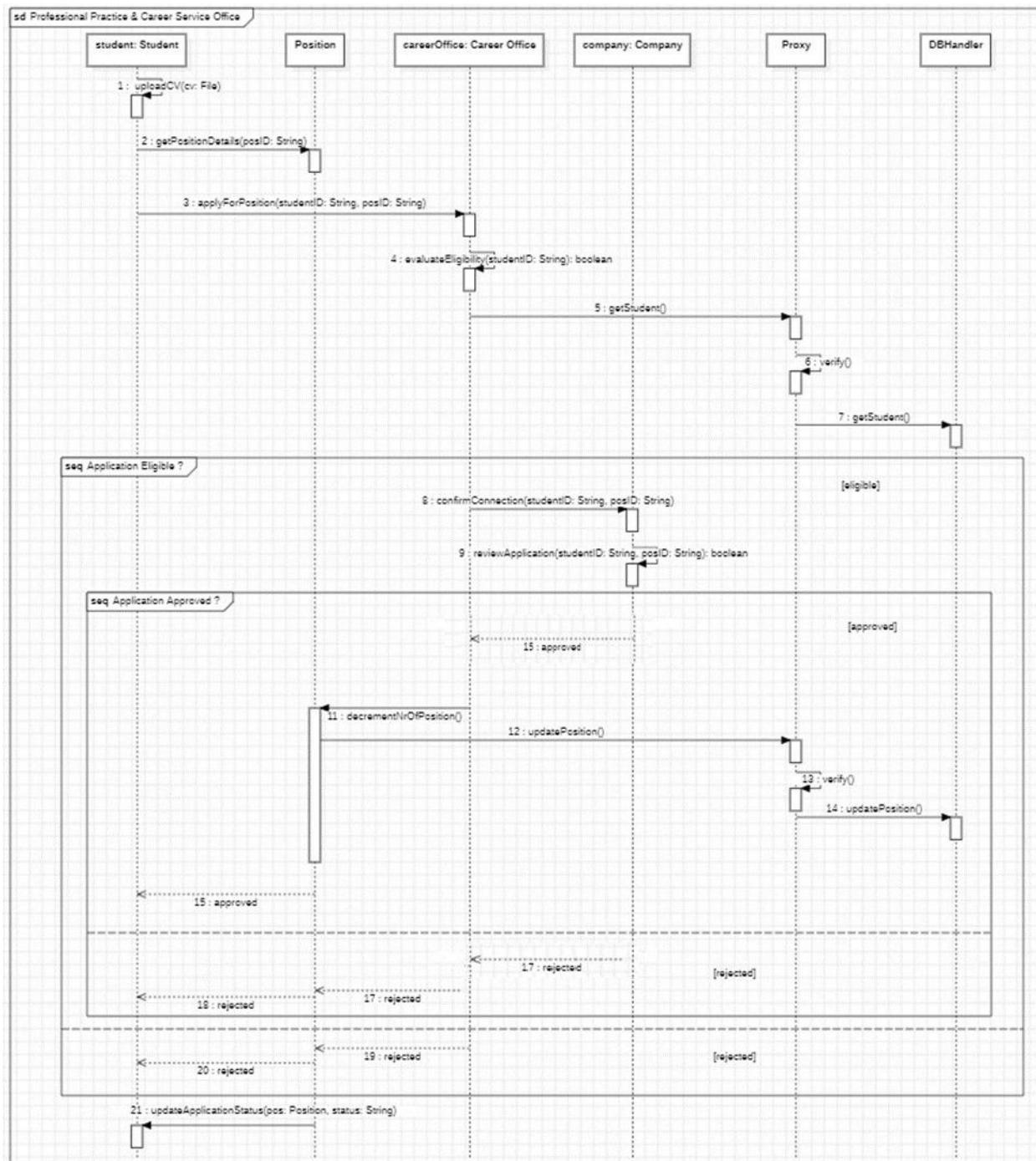
Sequence Diagram – UIS-SeD-5



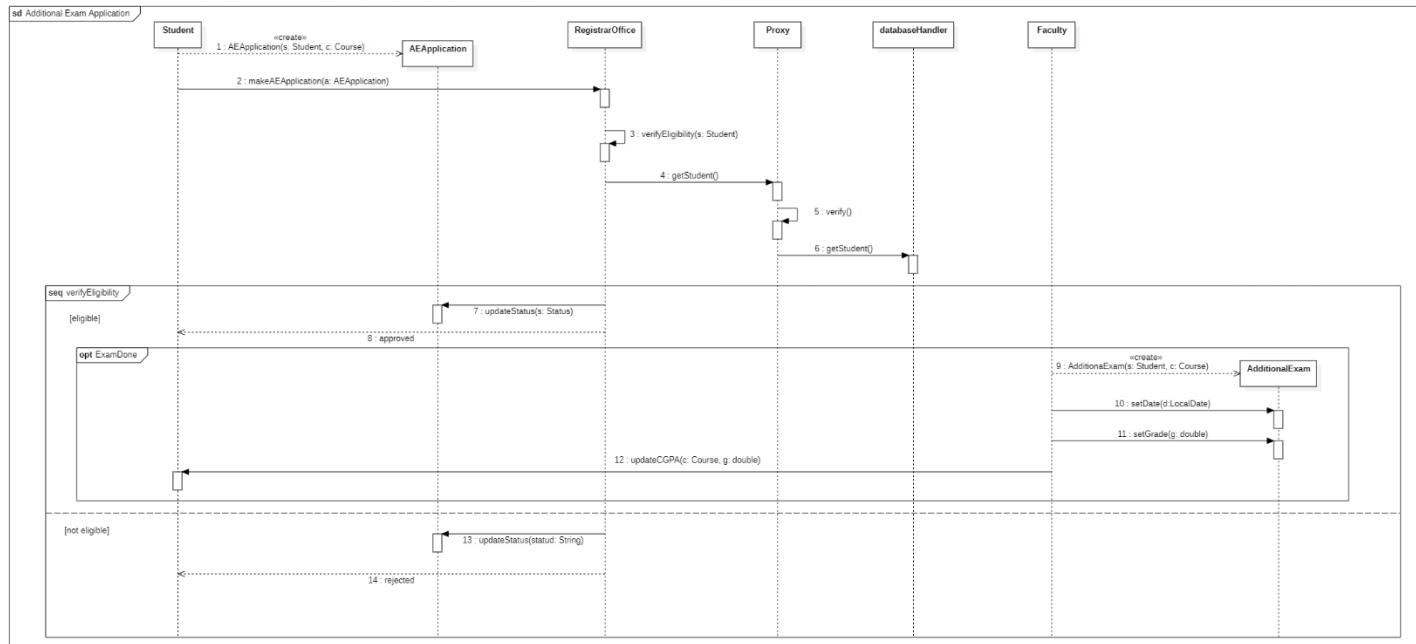
Sequence Diagram – UIS-SeD-6



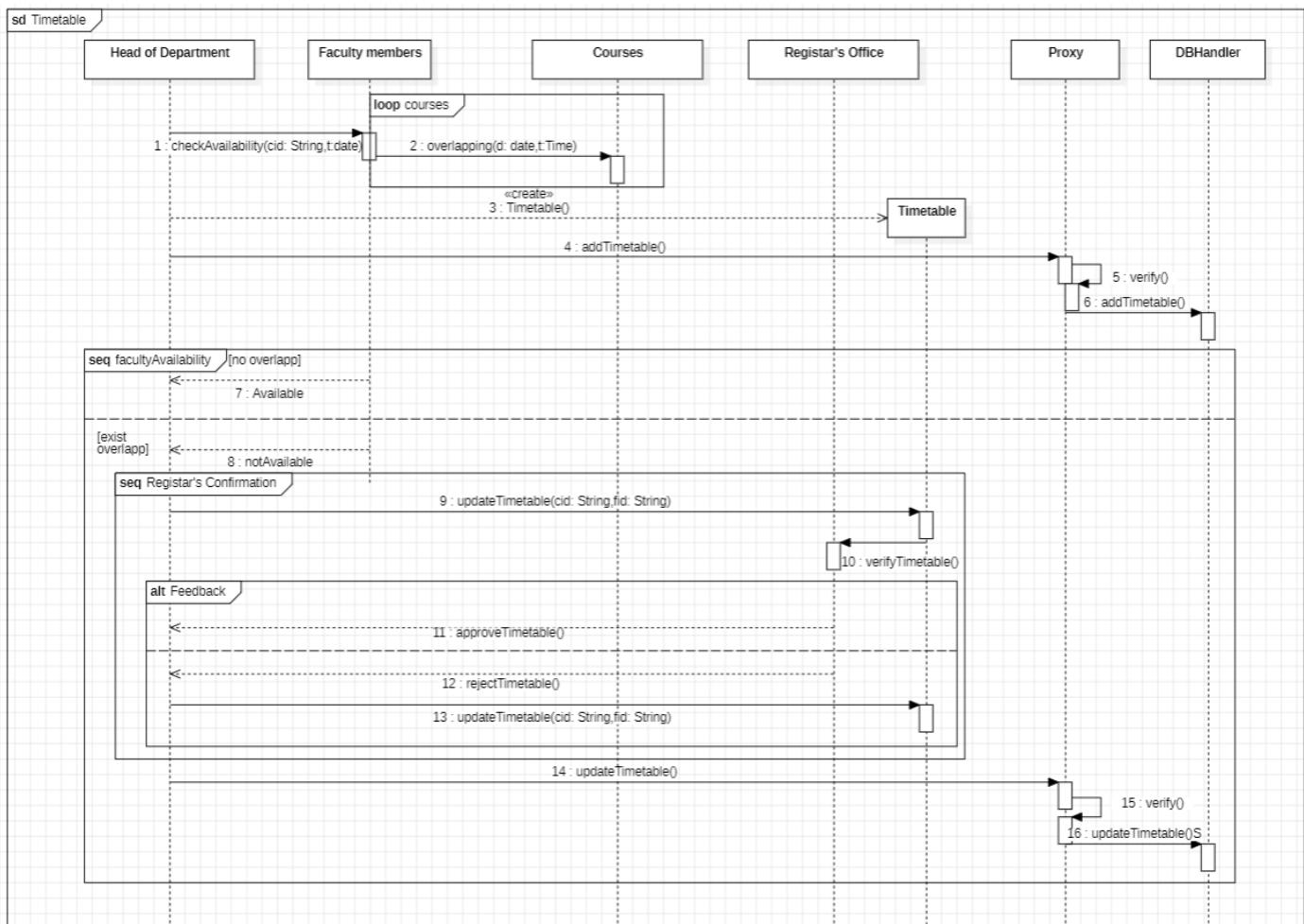
Sequence Diagram – UIS-SeD-7



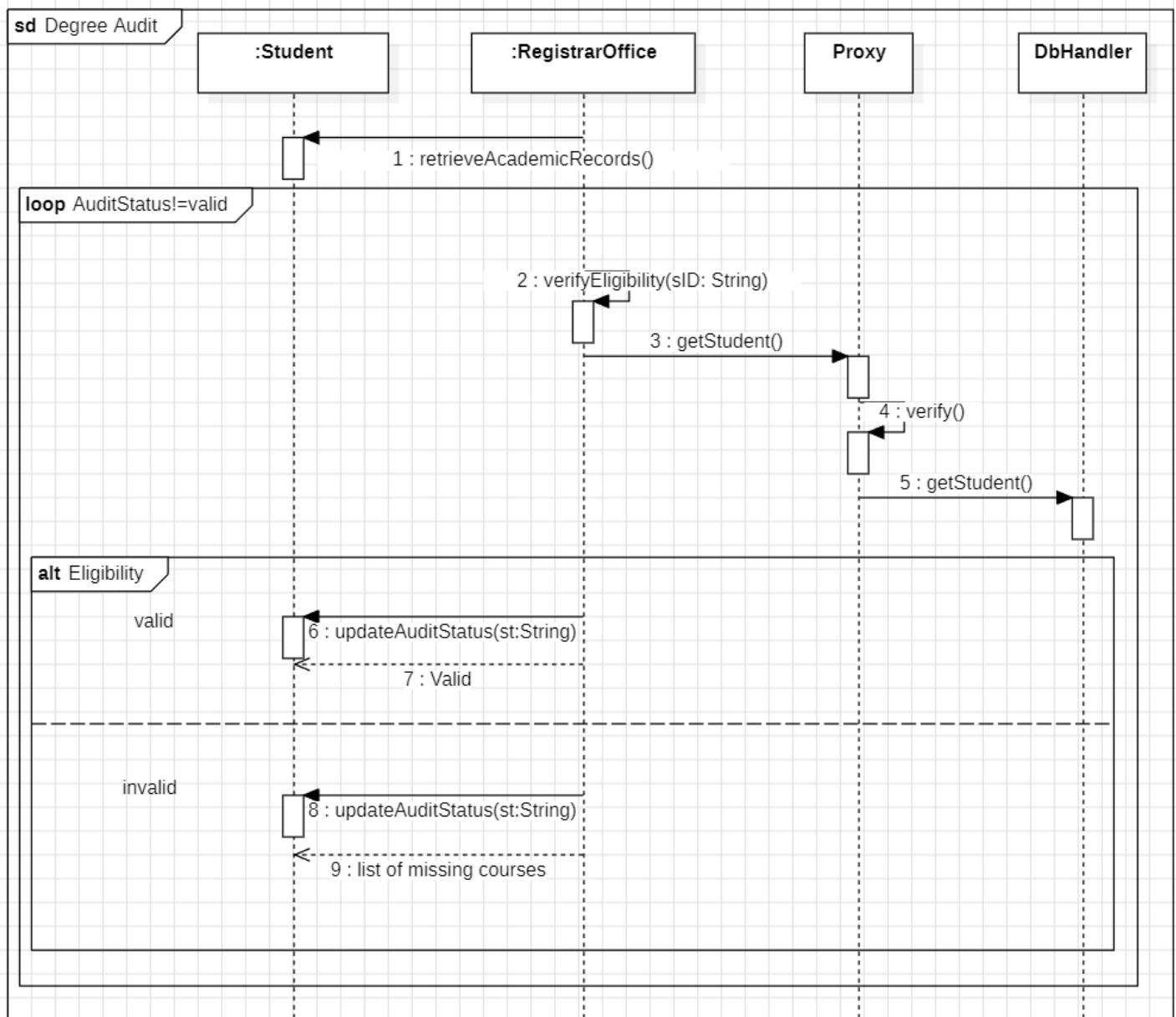
Sequence Diagram – UIS-SeD-8



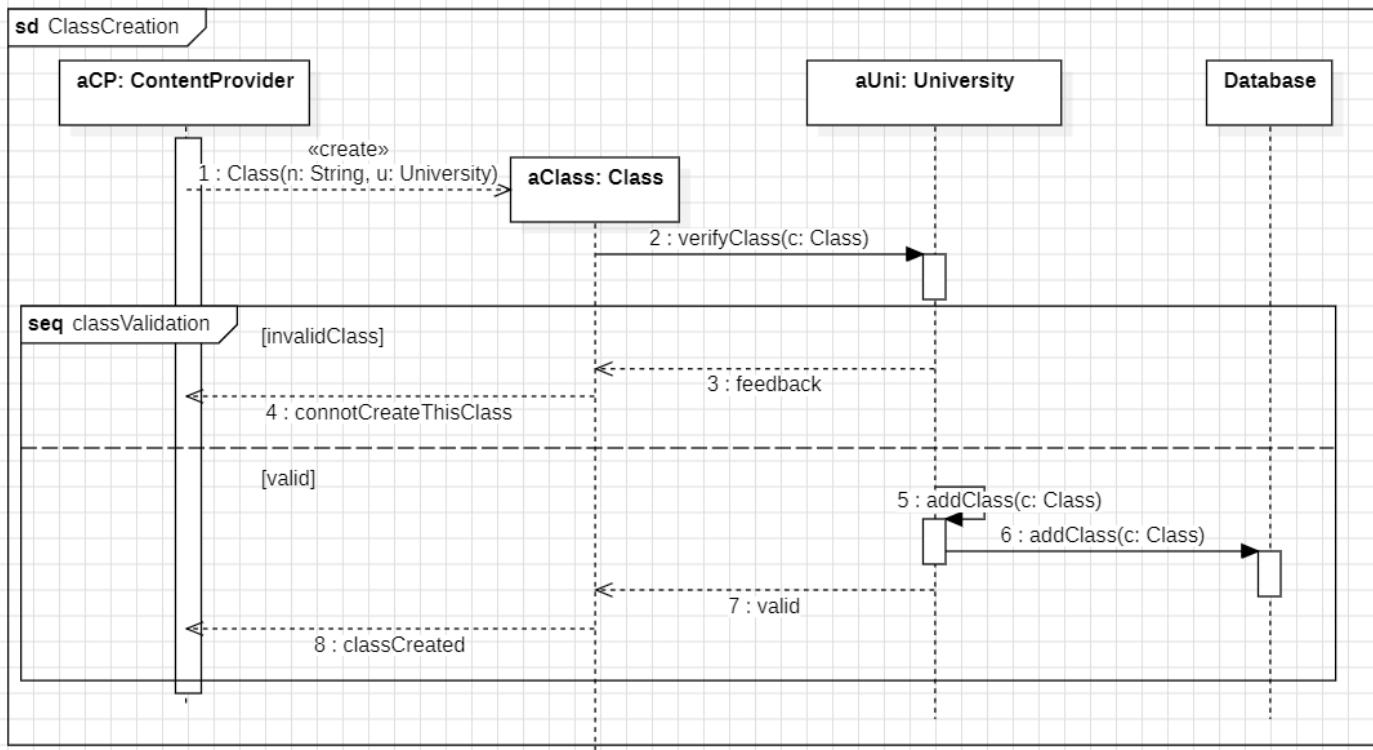
Sequence Diagram – UIS-SeD-9



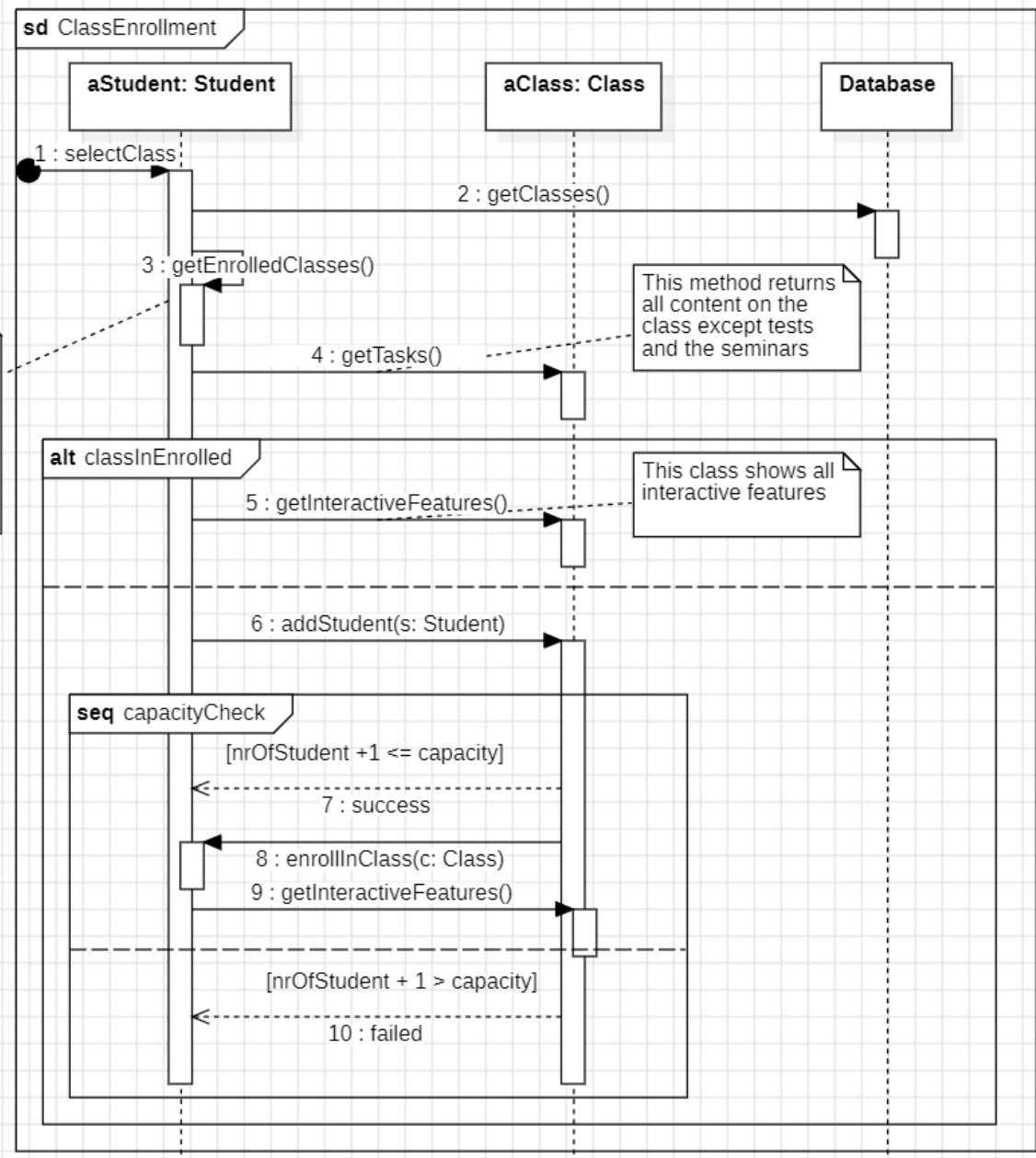
Sequence Diagram – UIS-SeD-10



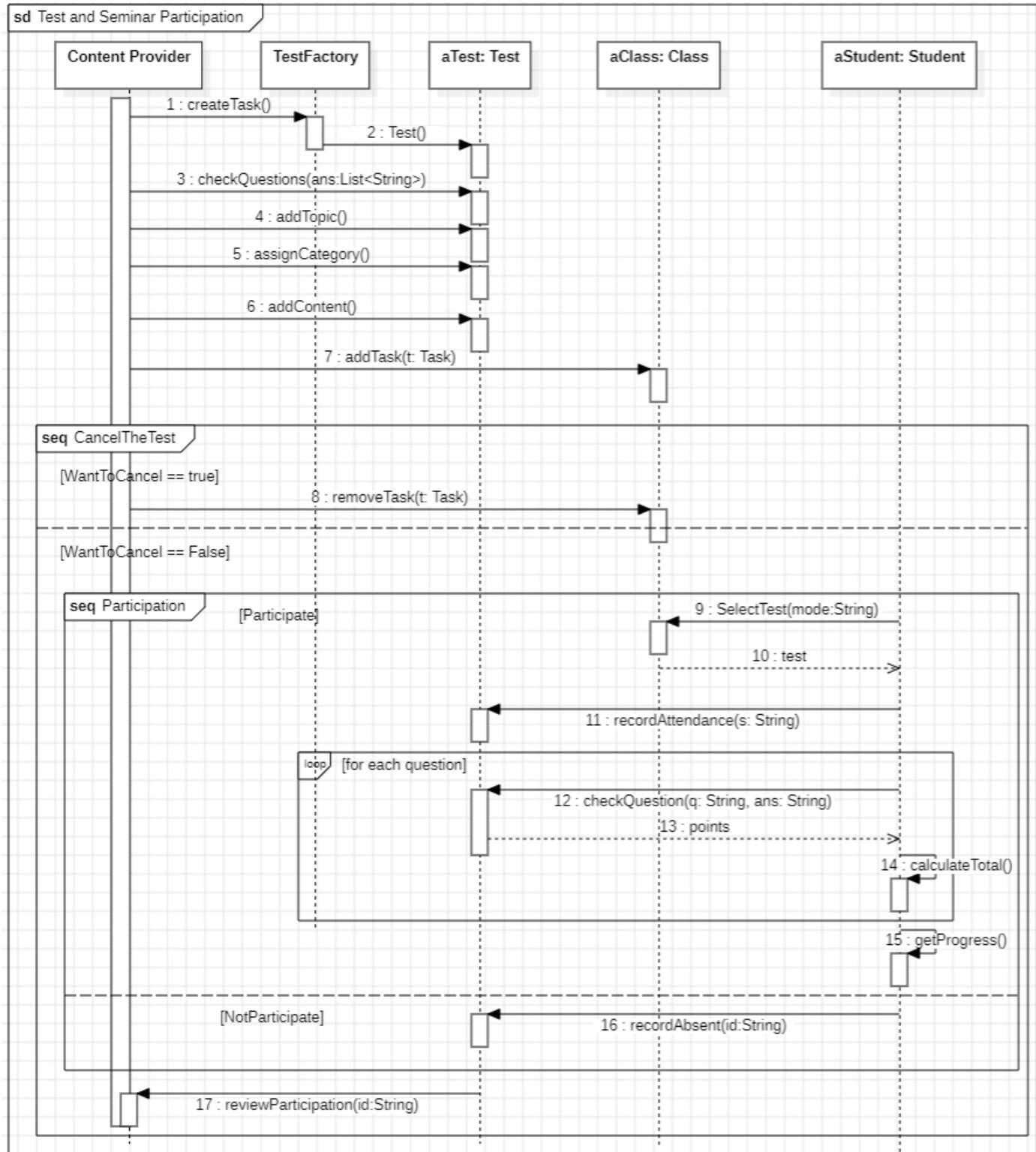
Sequence Diagram – ThinkLink-SeD-1



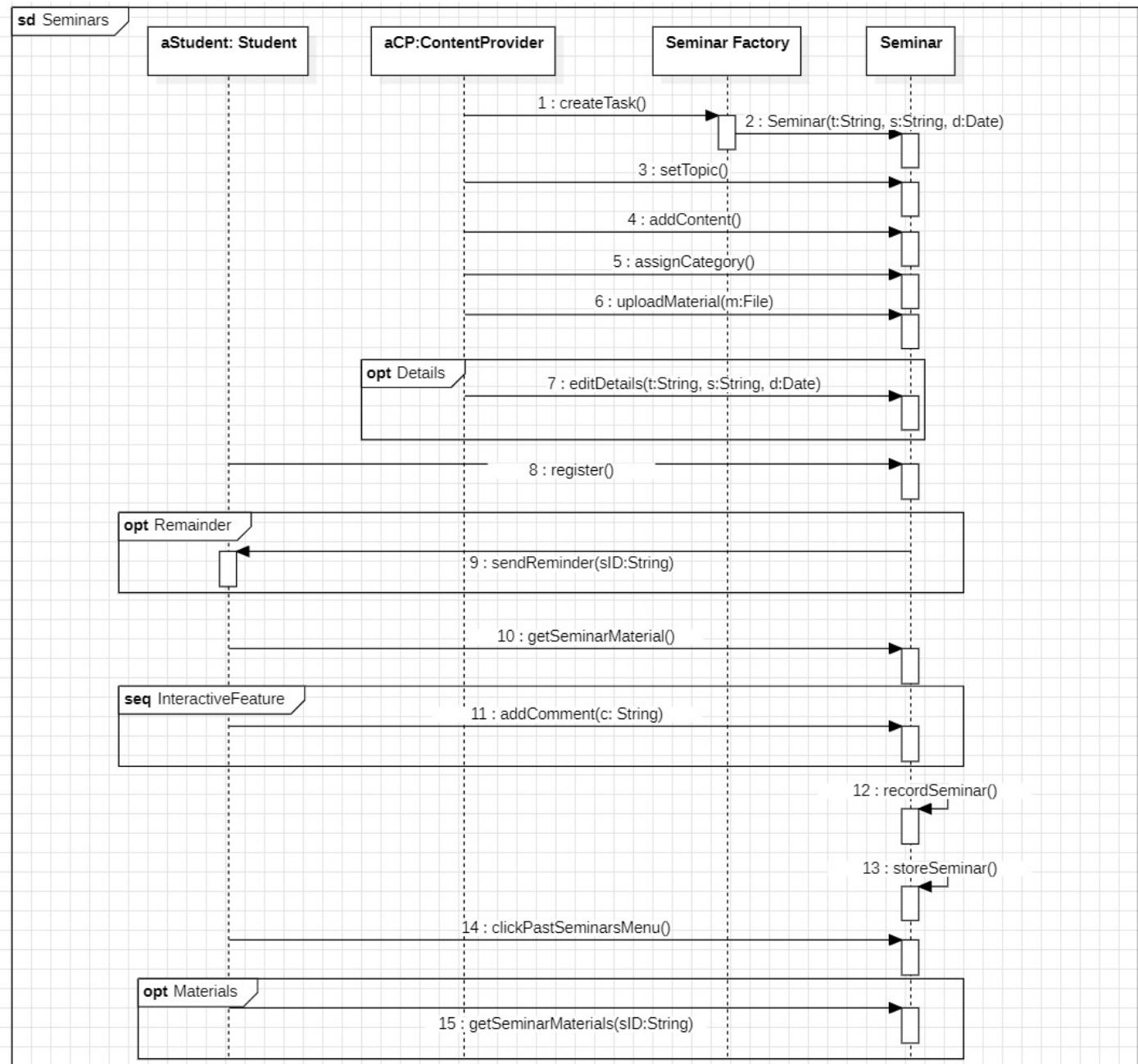
Sequence Diagram – ThinkLink-SeD-2



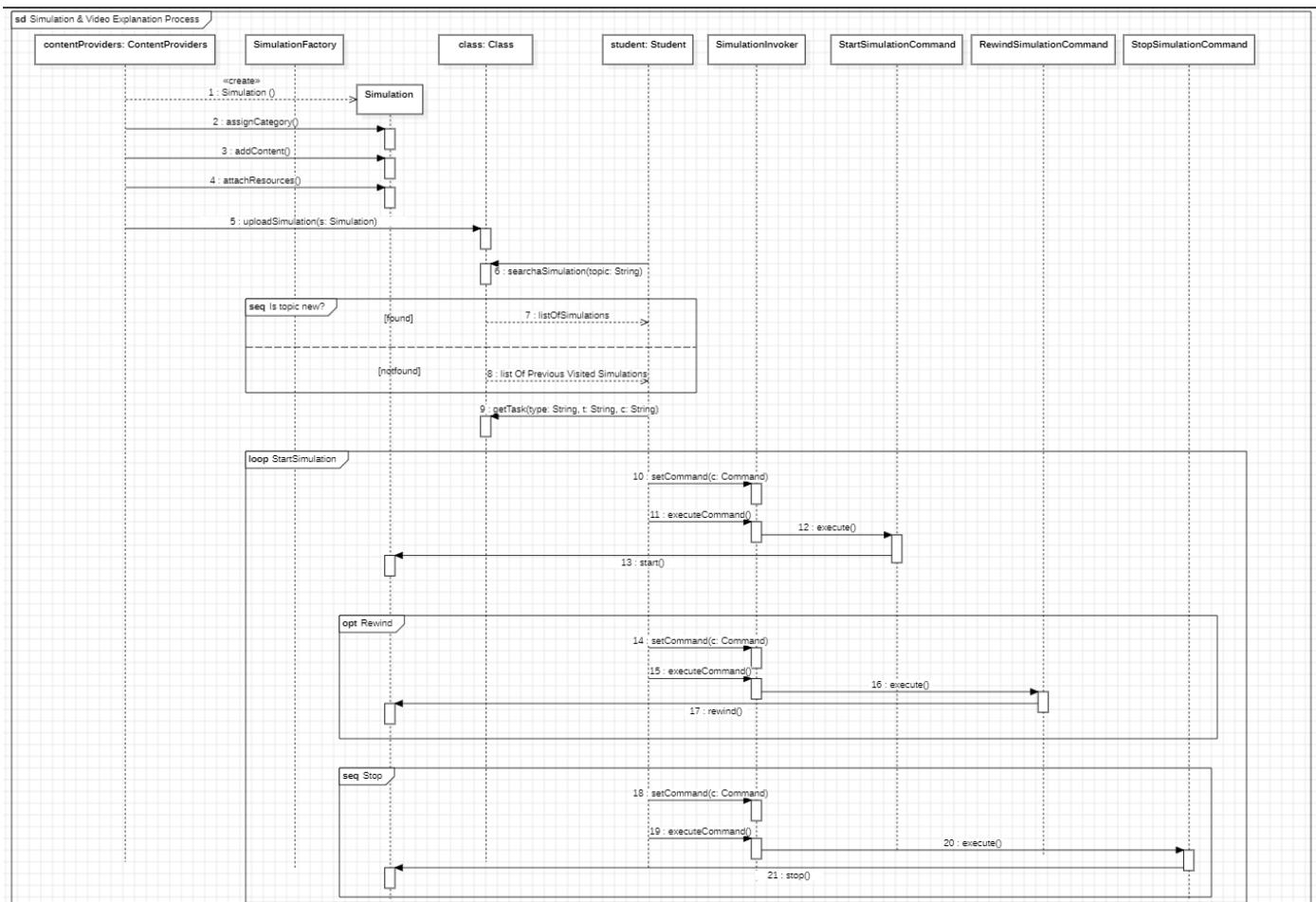
Sequence Diagram – ThinkLink-SeD-3



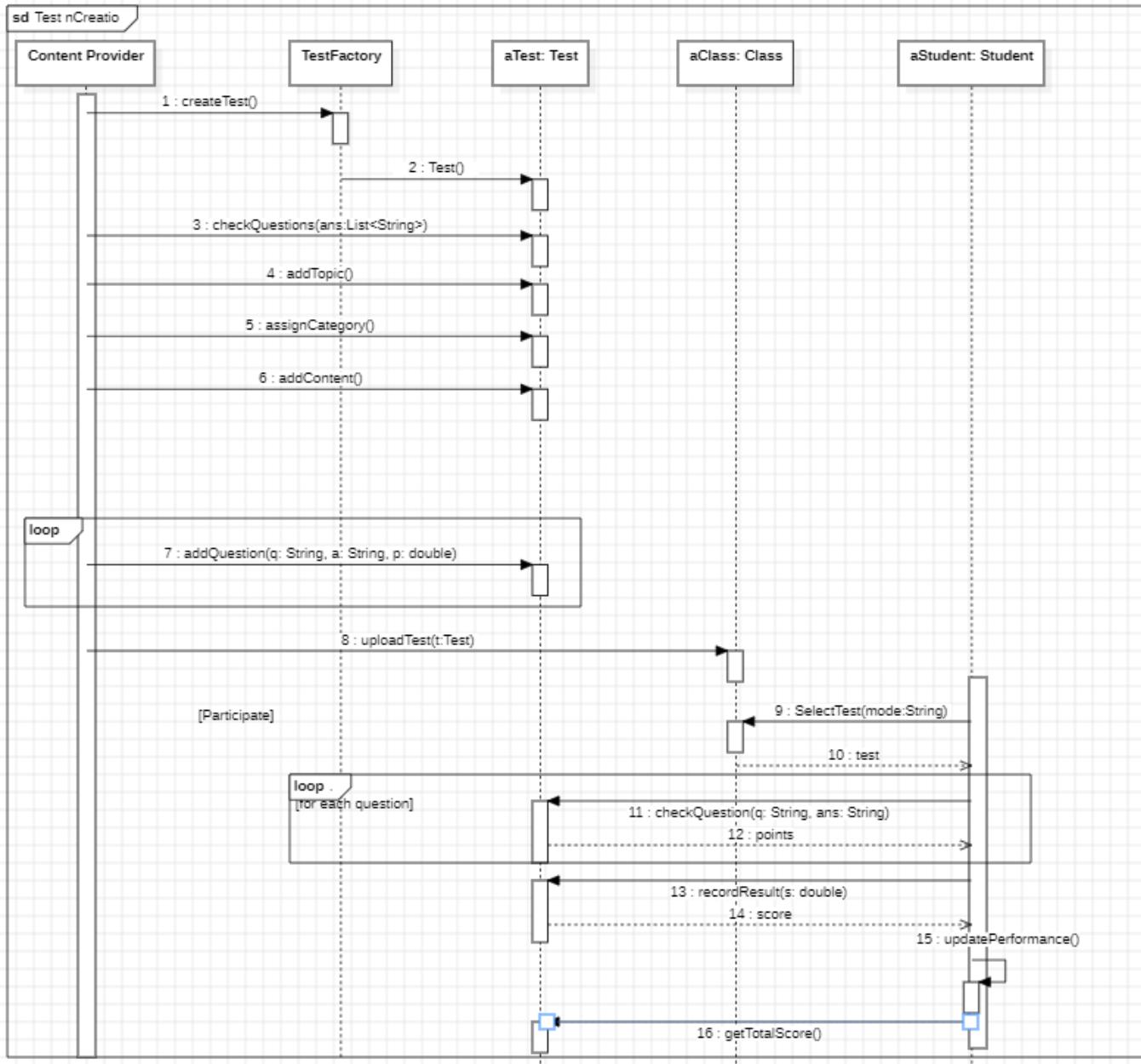
Sequence Diagram – ThinkLink-SeD-4



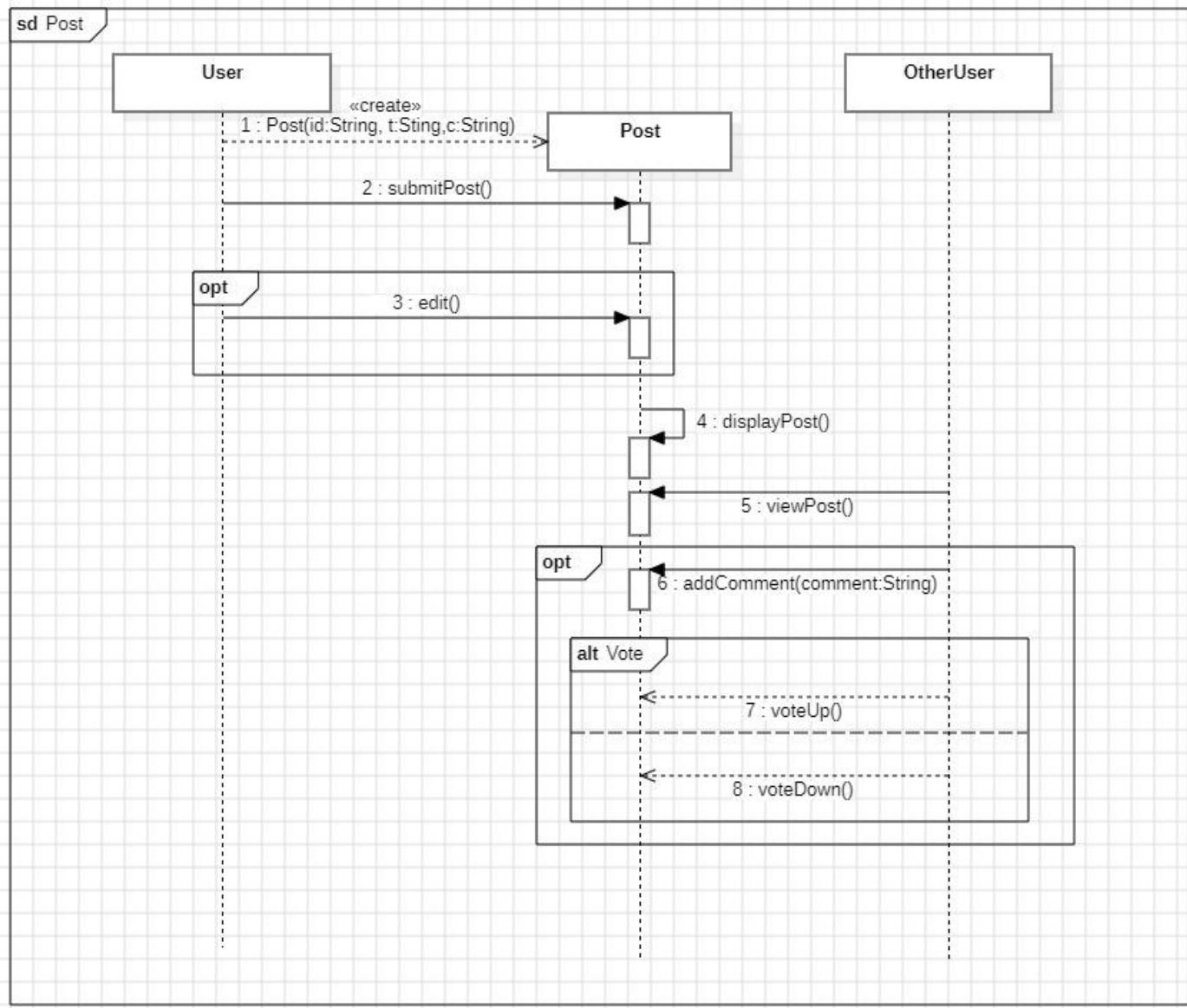
Sequence Diagram – ThinkLink-SeD-5



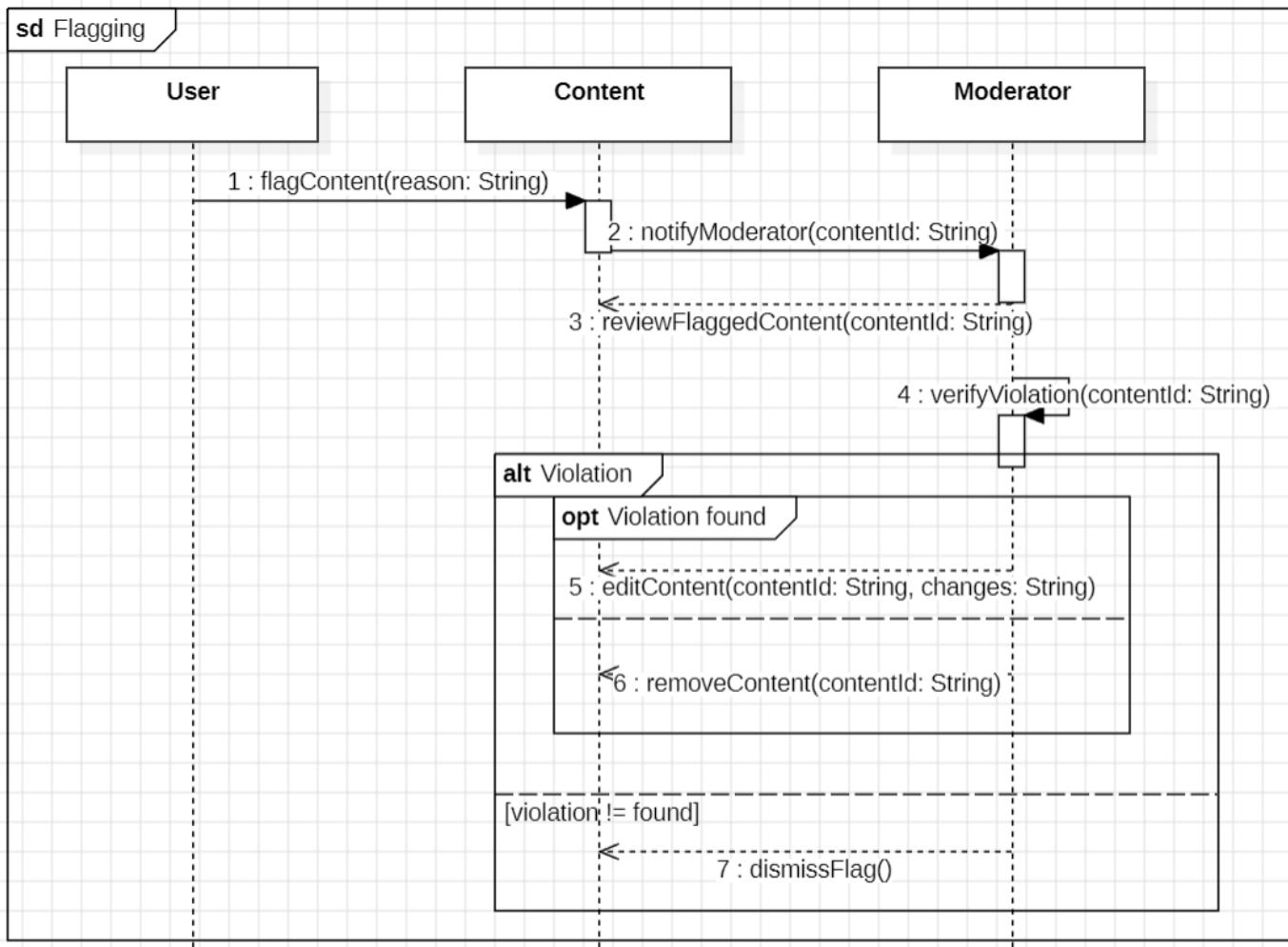
Sequence Diagram – ThinkLink-SeD-6



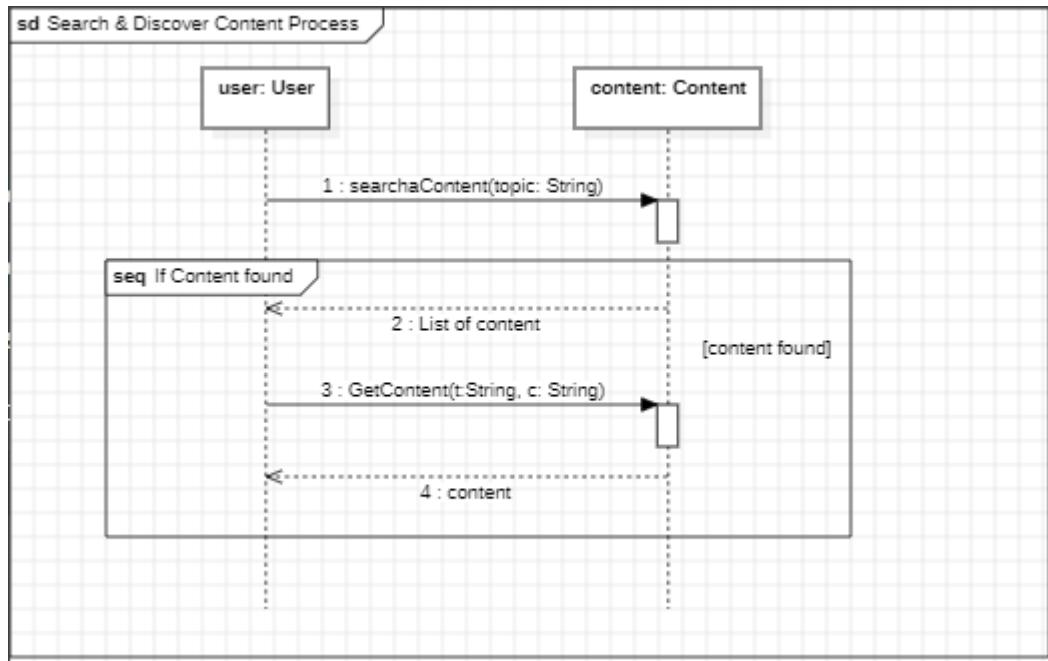
Sequence Diagram – ThinkLink-SeD-7



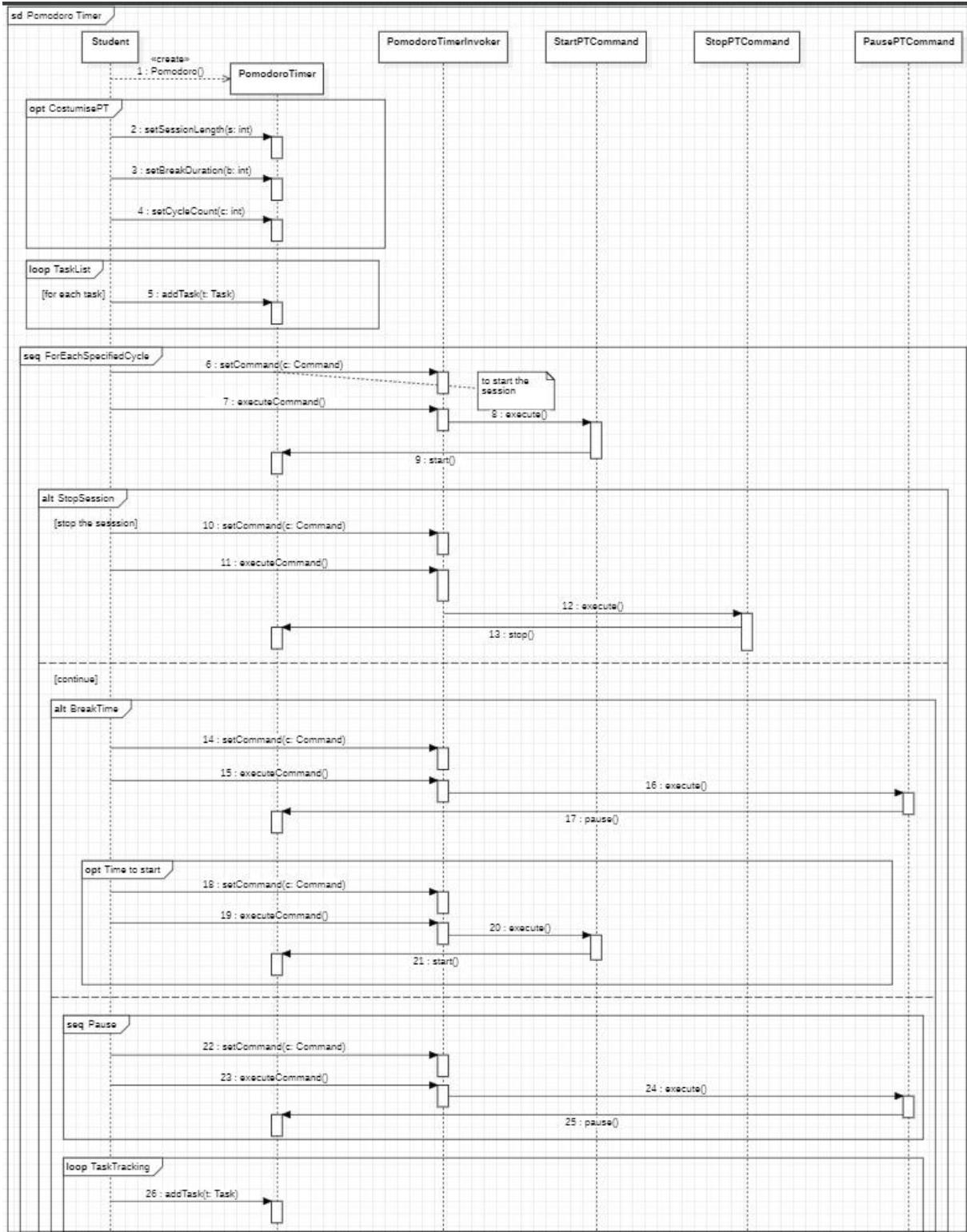
Sequence Diagram – ThinkLink-SeD-8



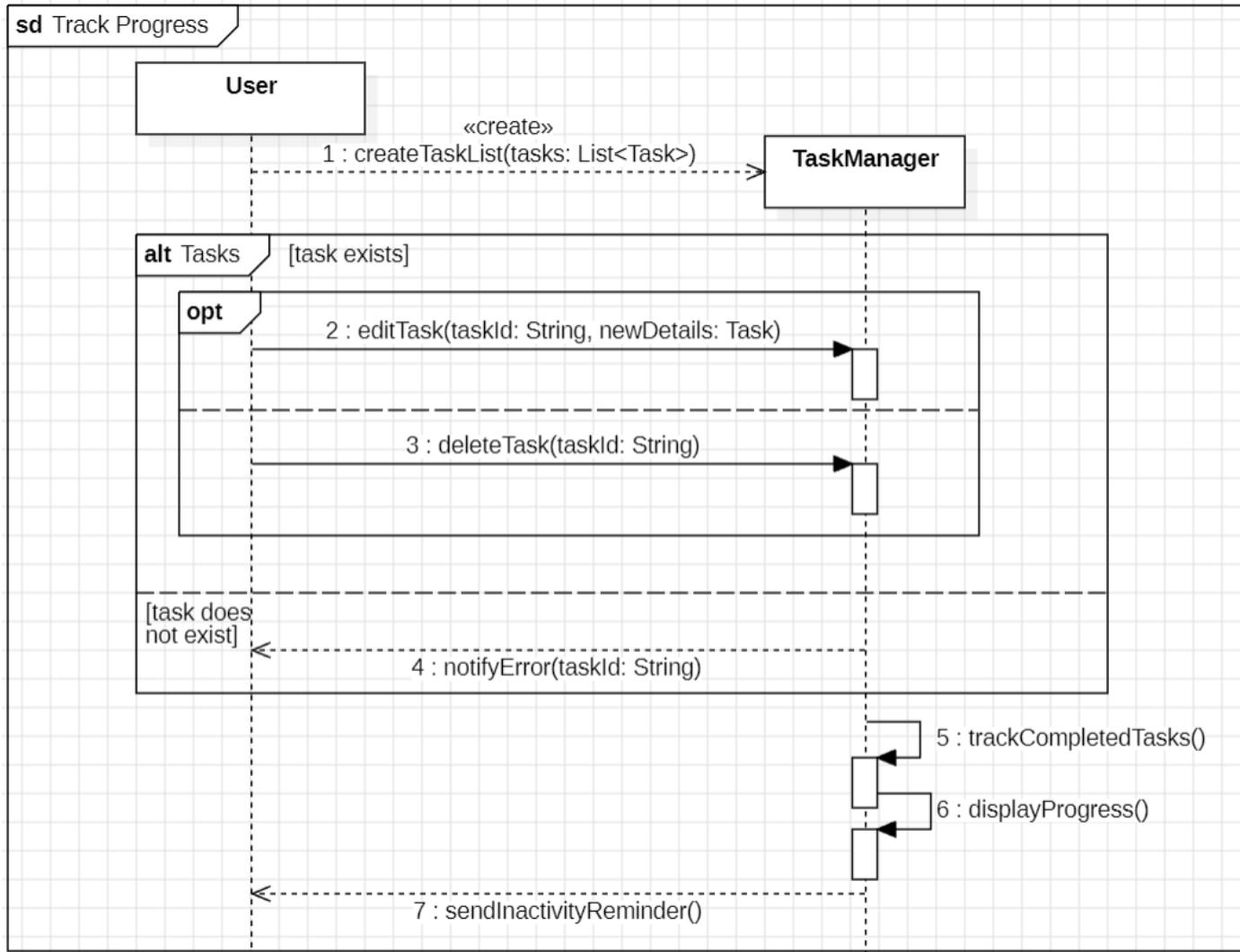
Sequence Diagram – ThinkLink-SeD-9



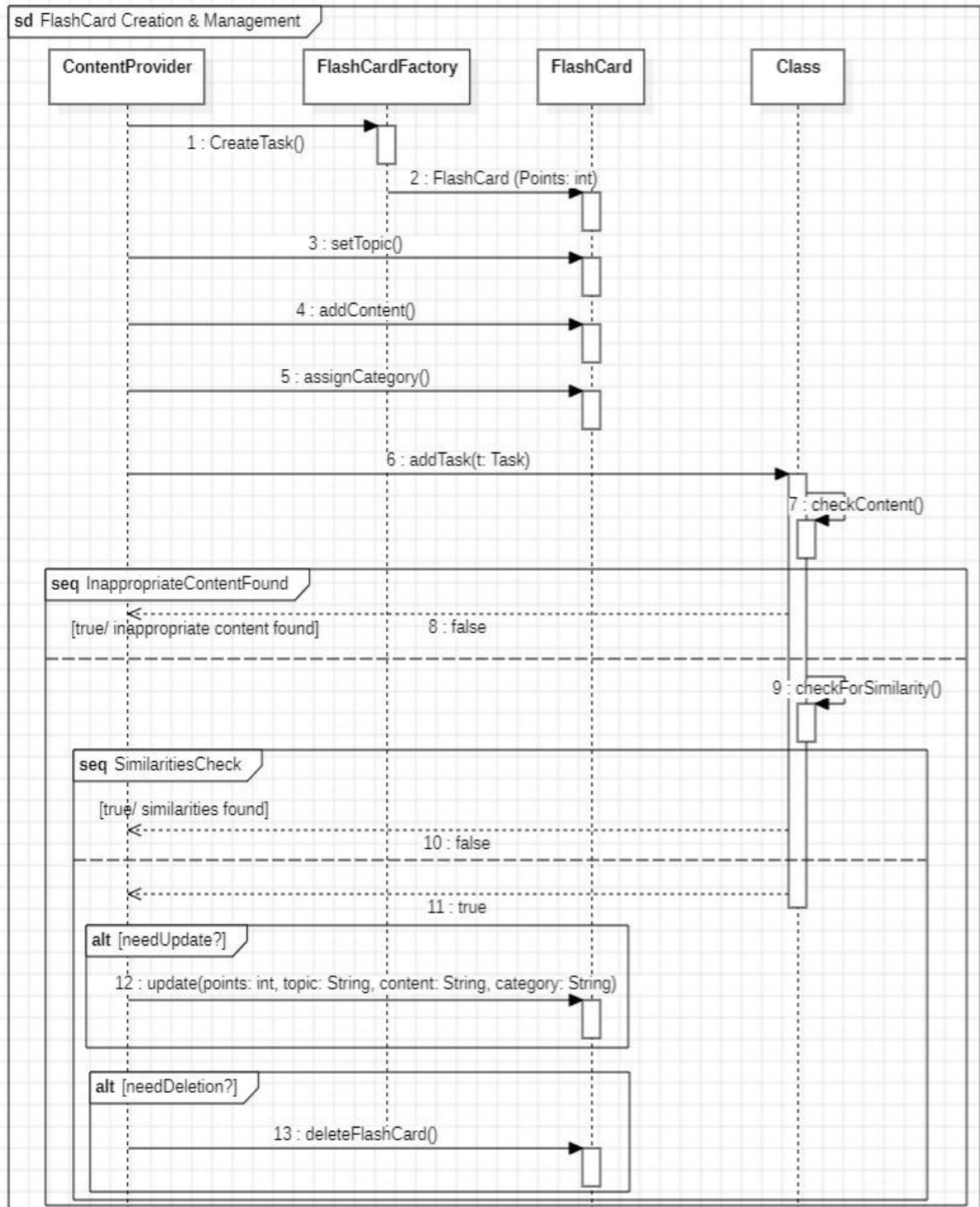
Sequence Diagram – ThinkLink-SeD-10



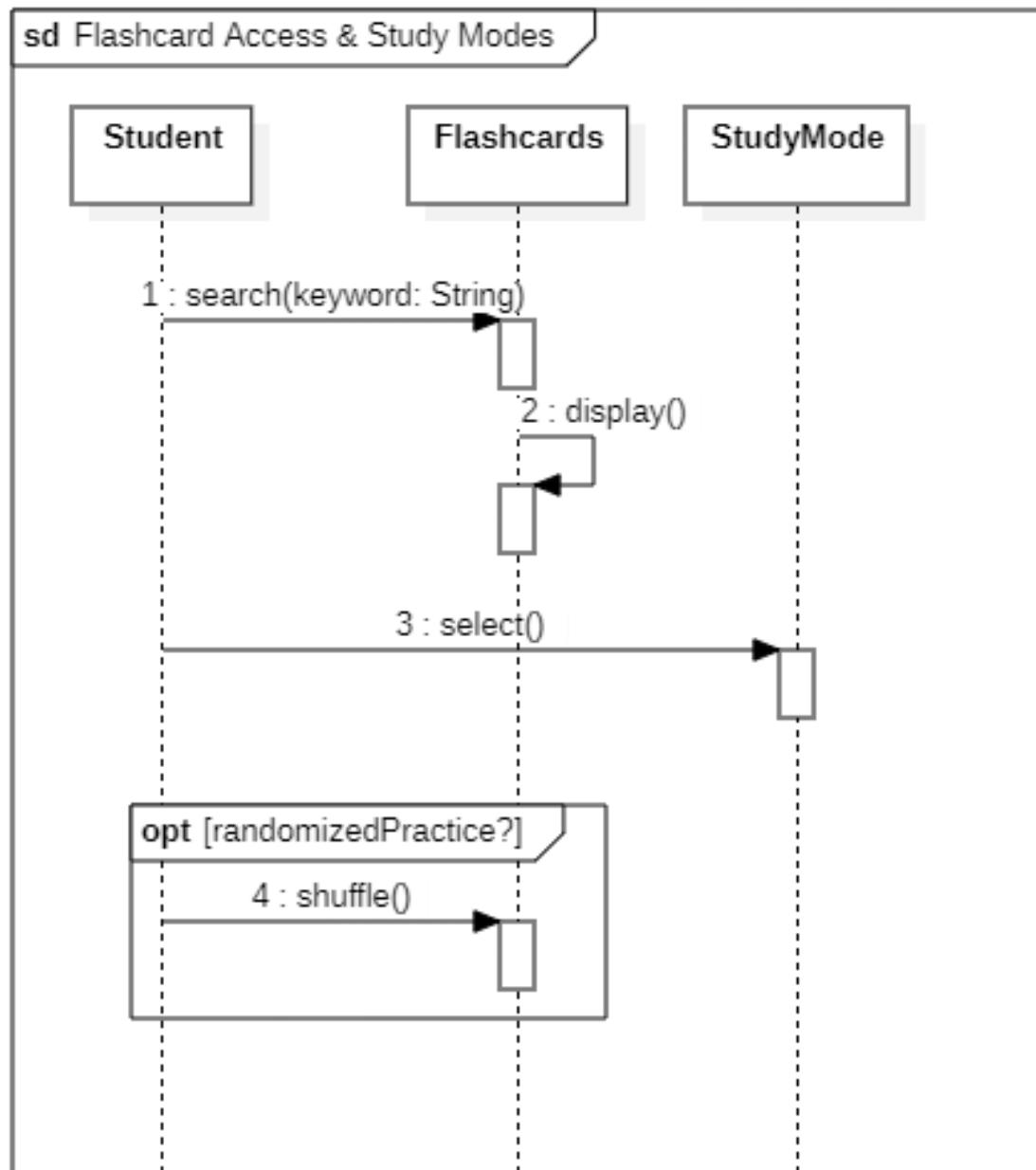
Sequence Diagram – ThinkLink-SeD-11



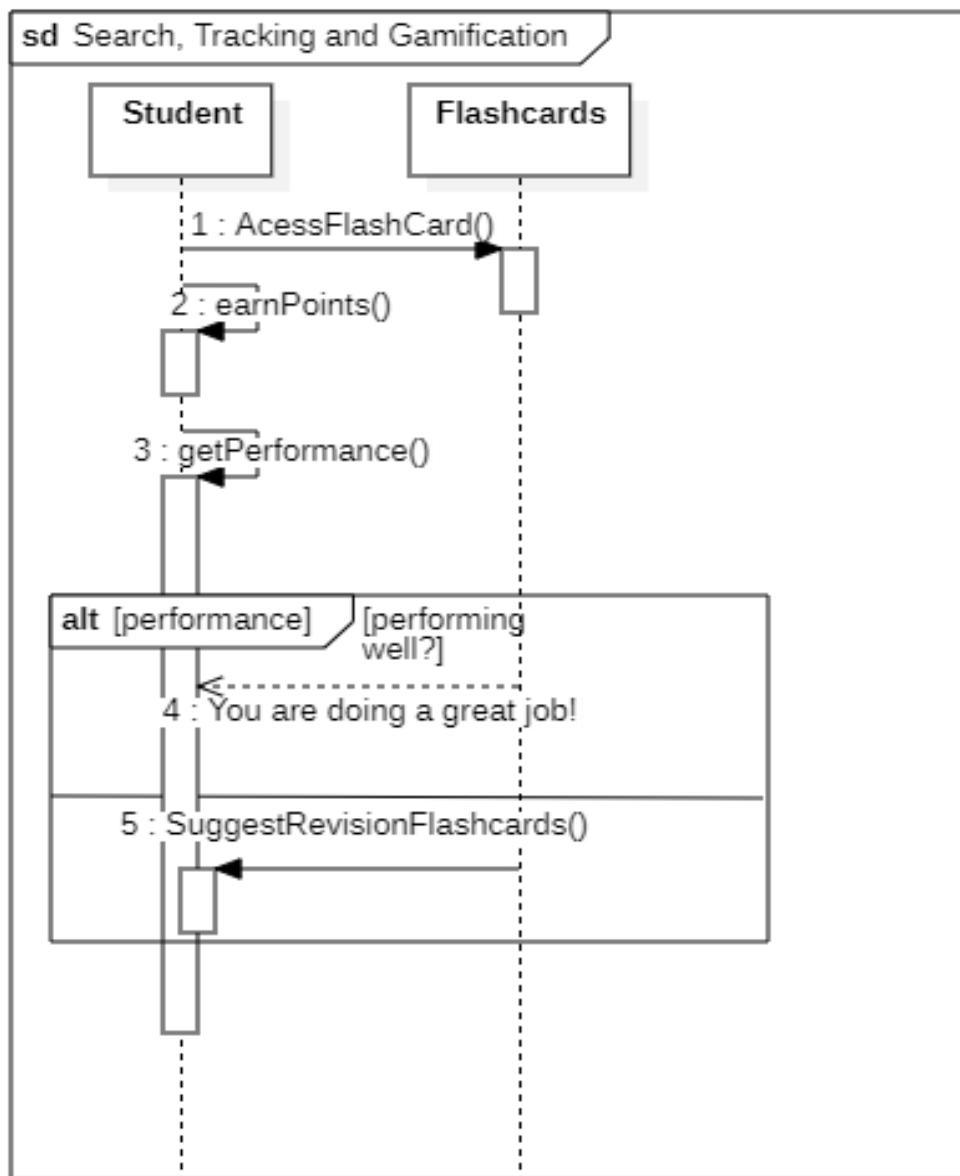
Sequence Diagram – ThinkLink-SeD-12



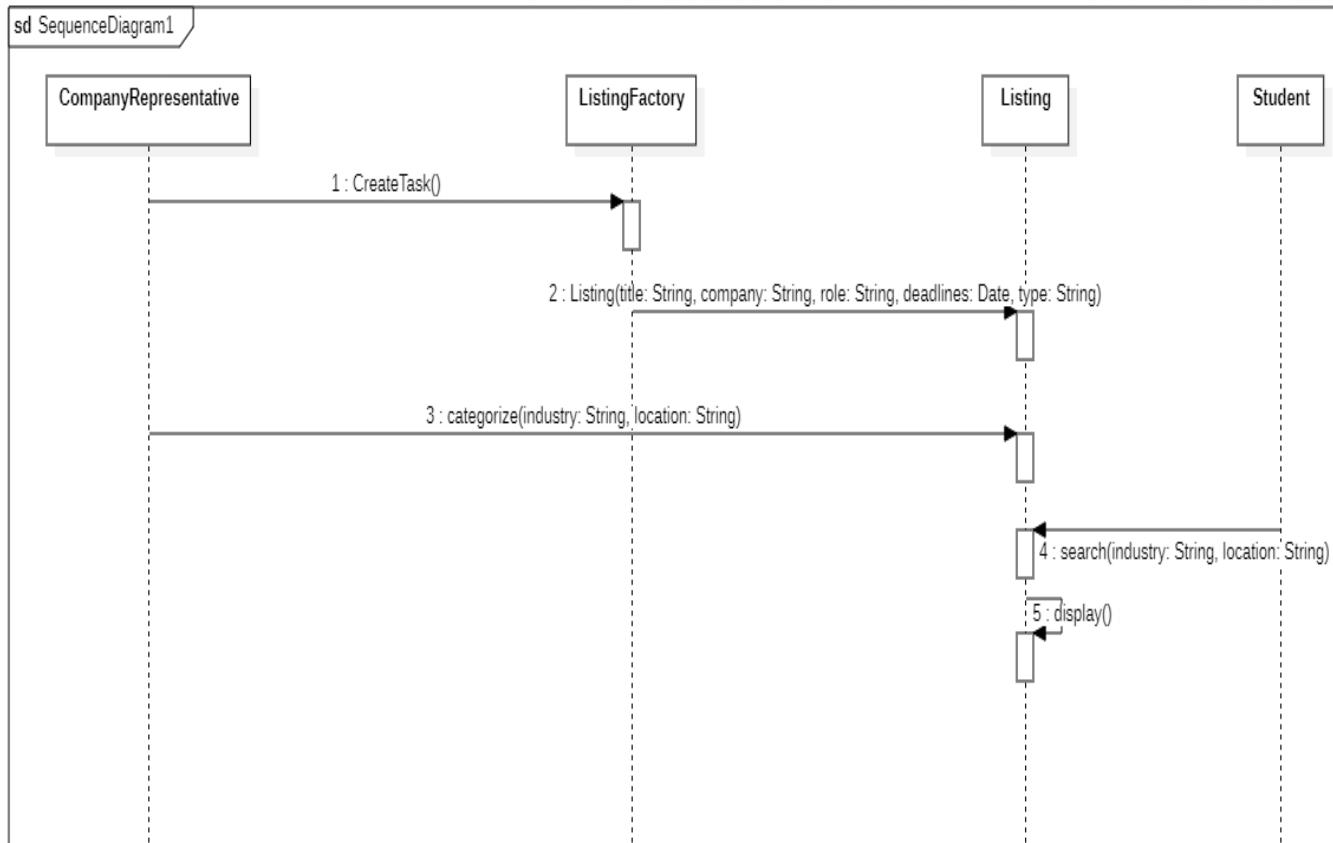
Sequence Diagram – ThinkLink-SeD-13



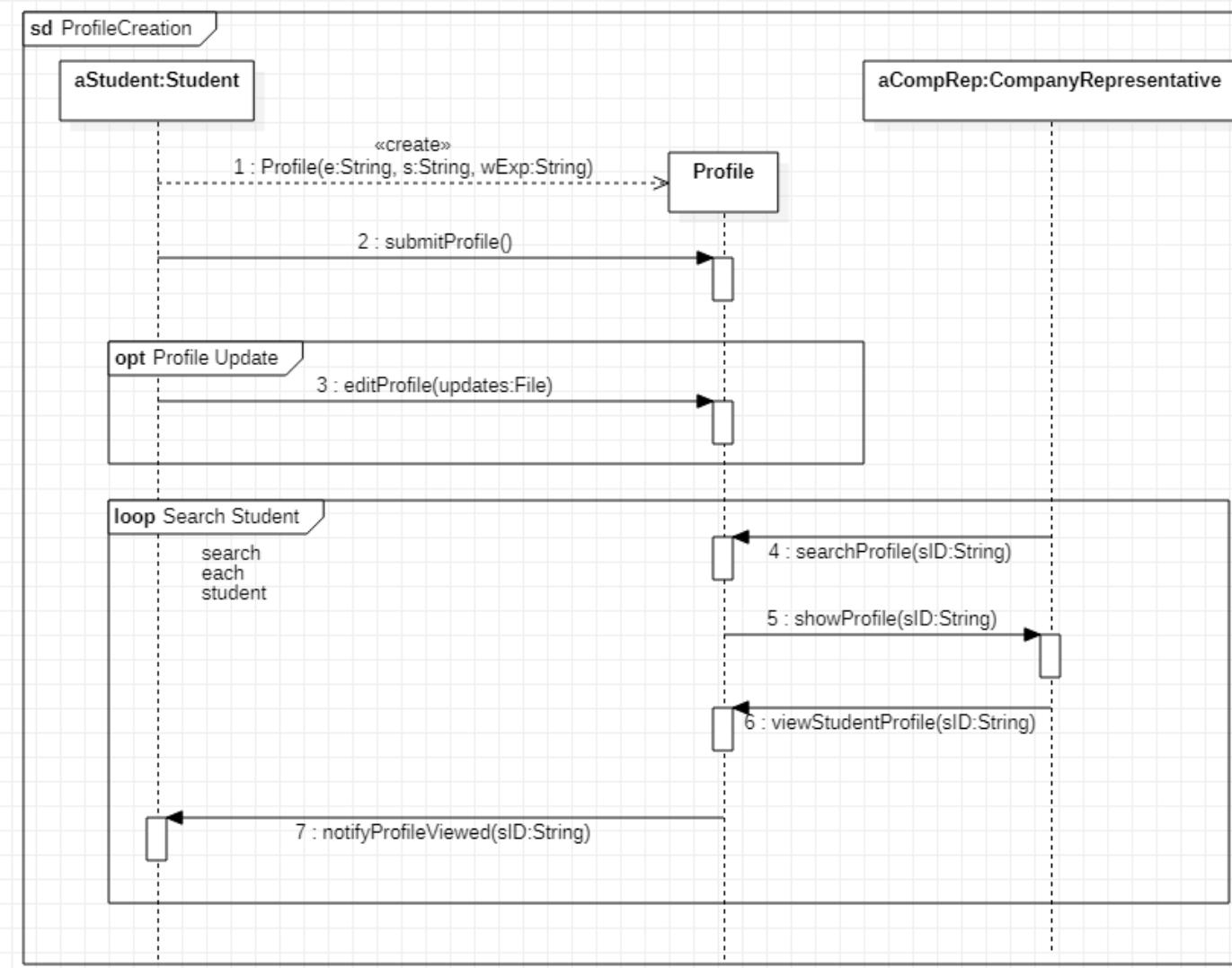
Sequence Diagram – ThinkLink-SeD-14



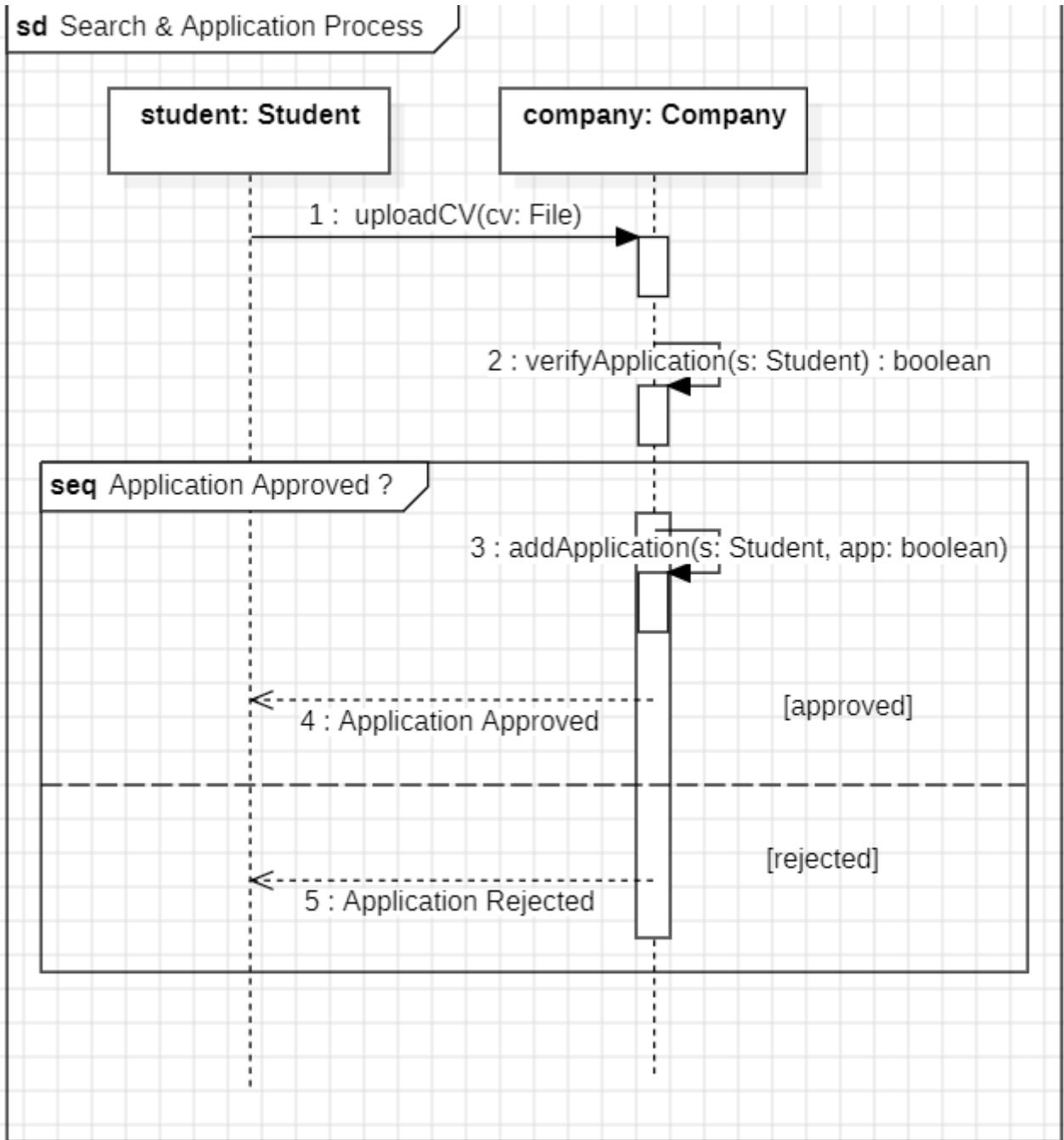
Sequence Diagram – ThinkLink-SeD-15



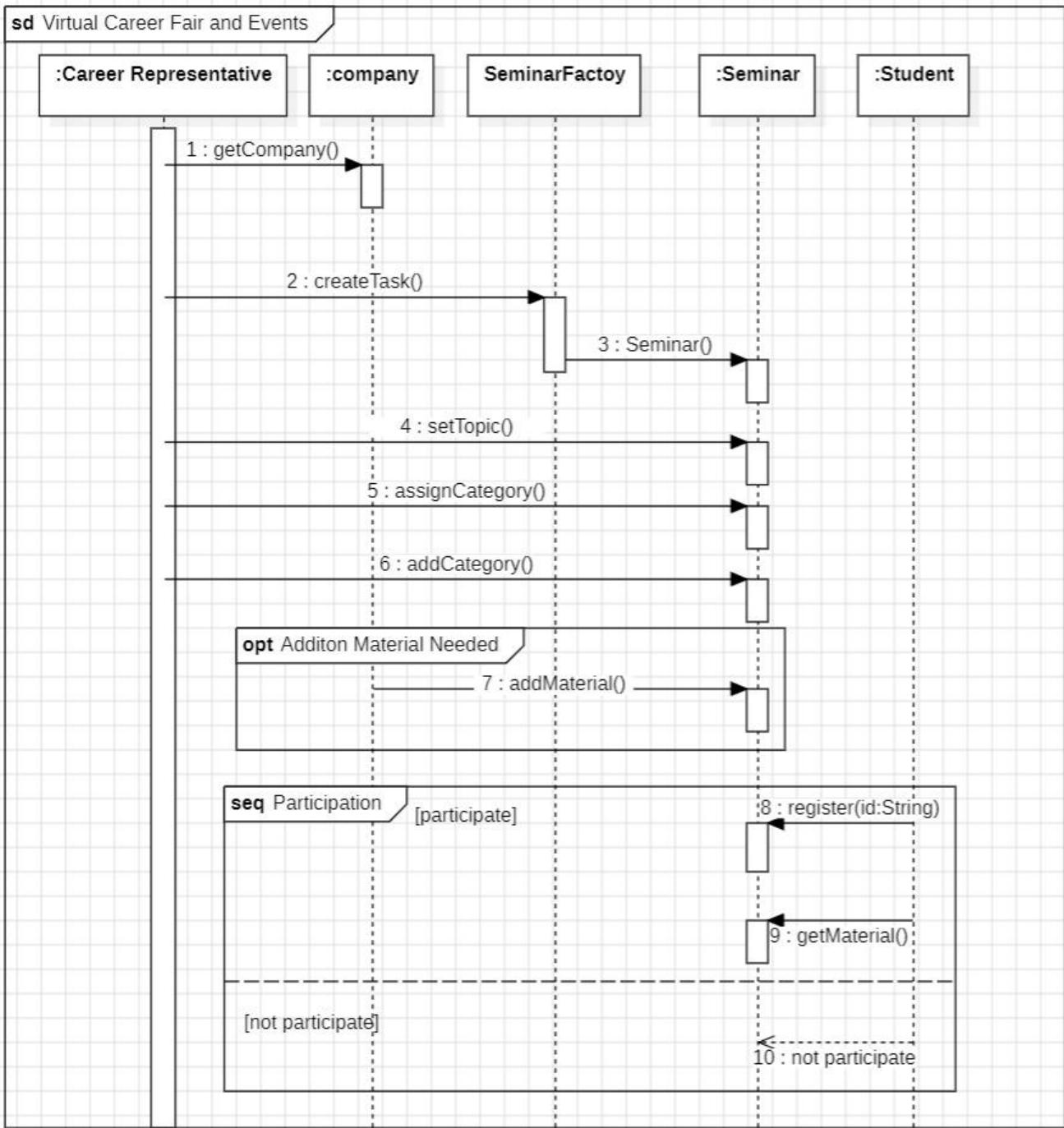
Sequence Diagram – ThinkLink-SeD-16



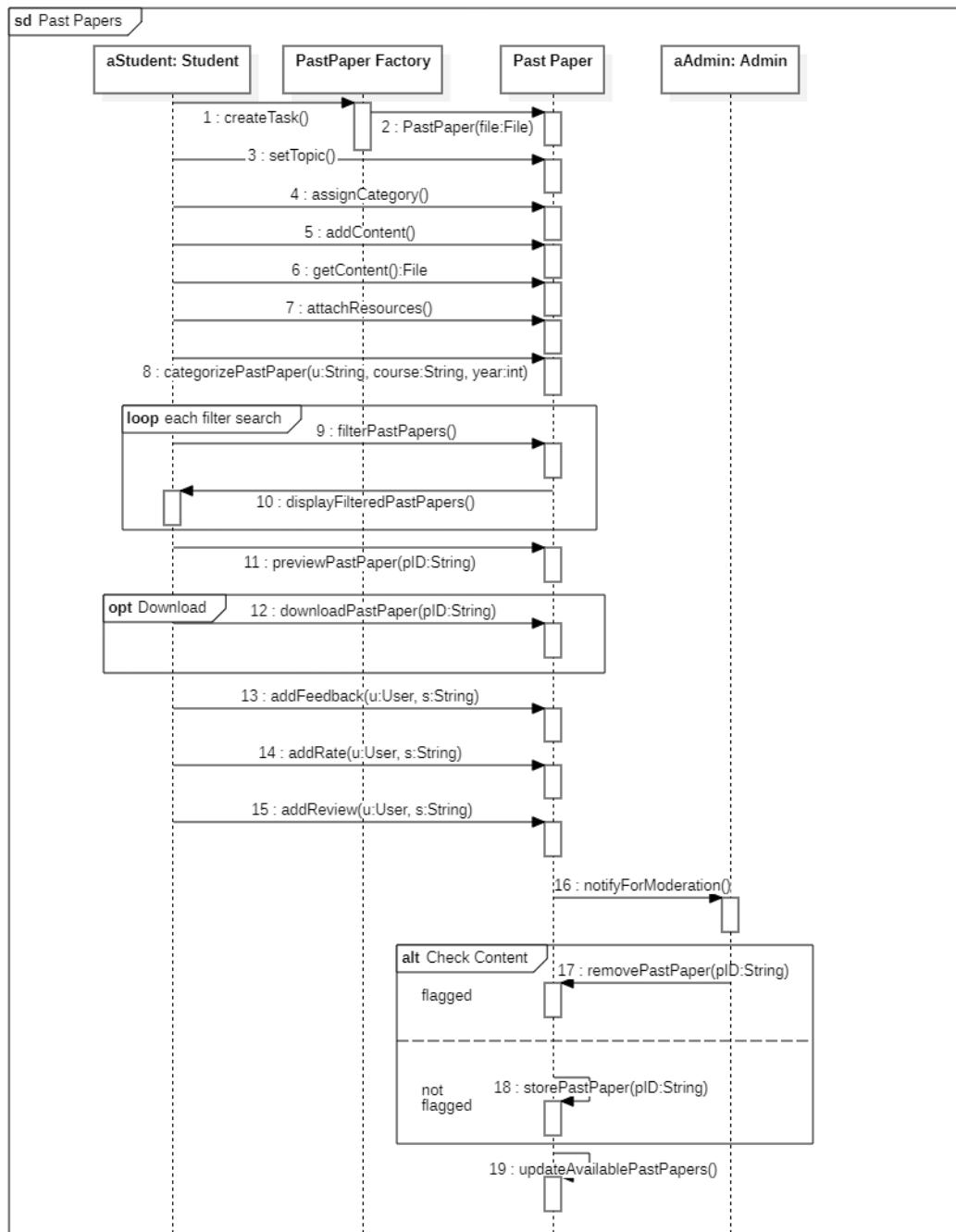
Sequence Diagram – ThinkLink-SeD-17



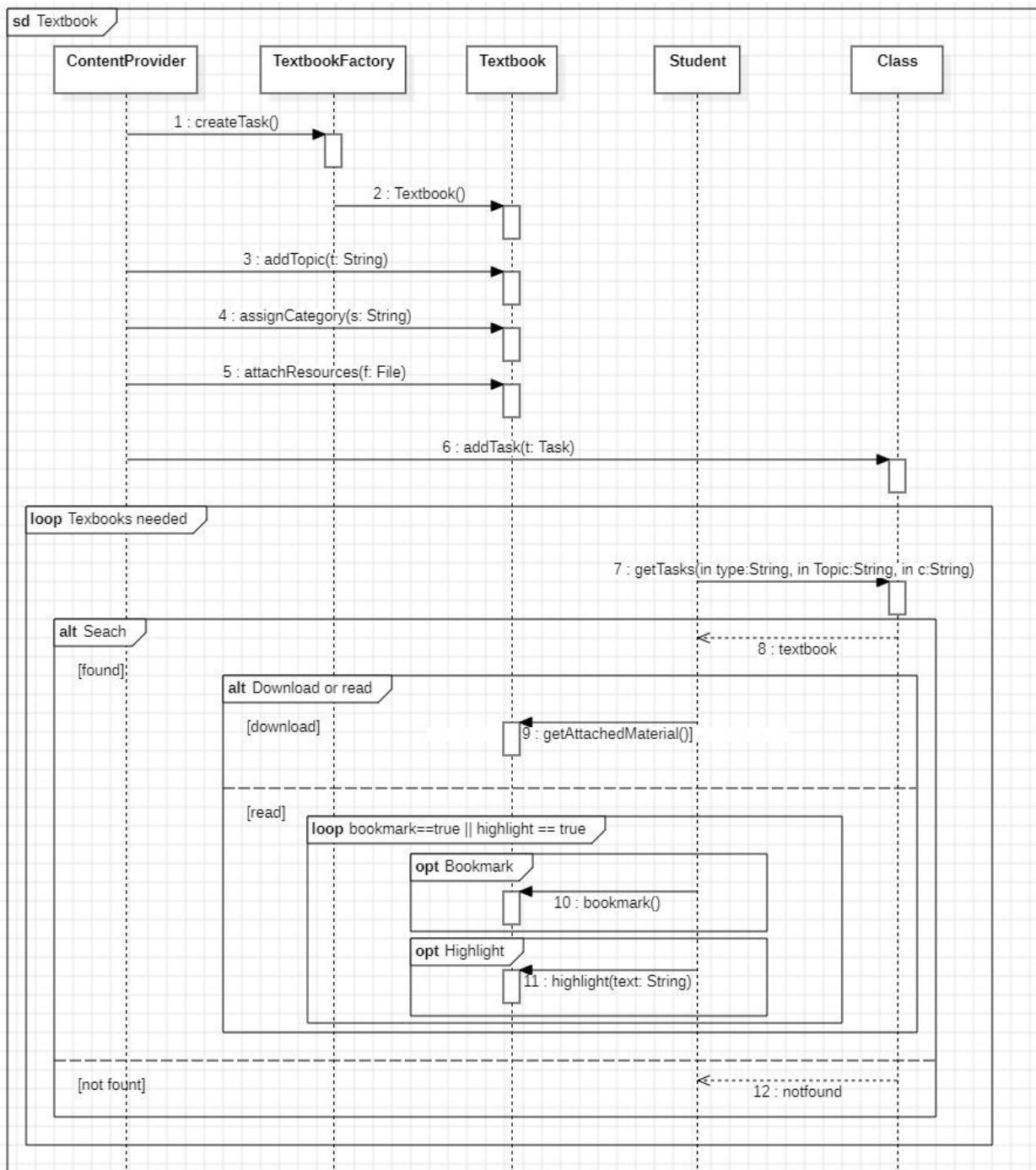
Sequence Diagram – ThinkLink-SeD-18



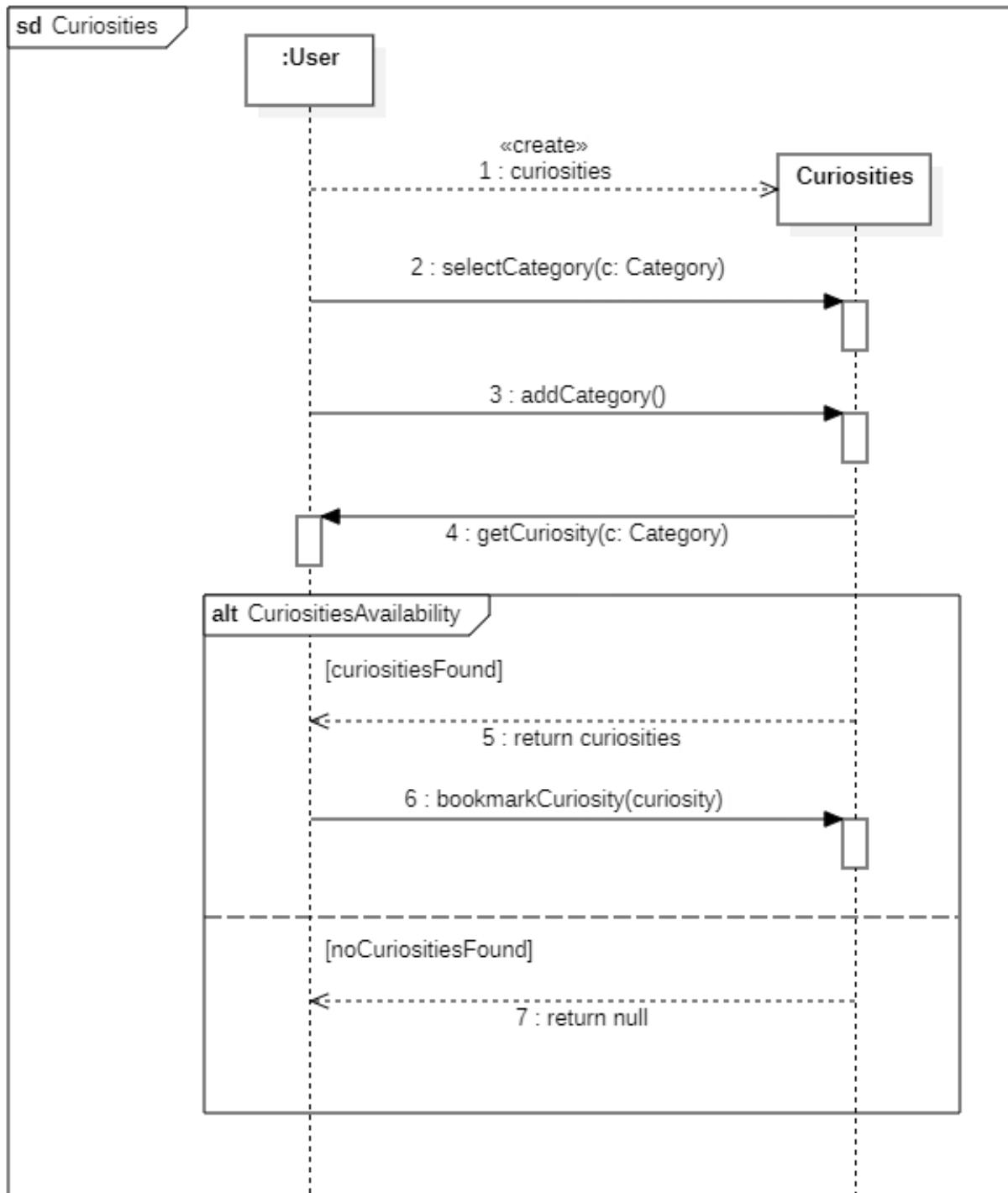
Sequence Diagram – ThinkLink-SeD-19



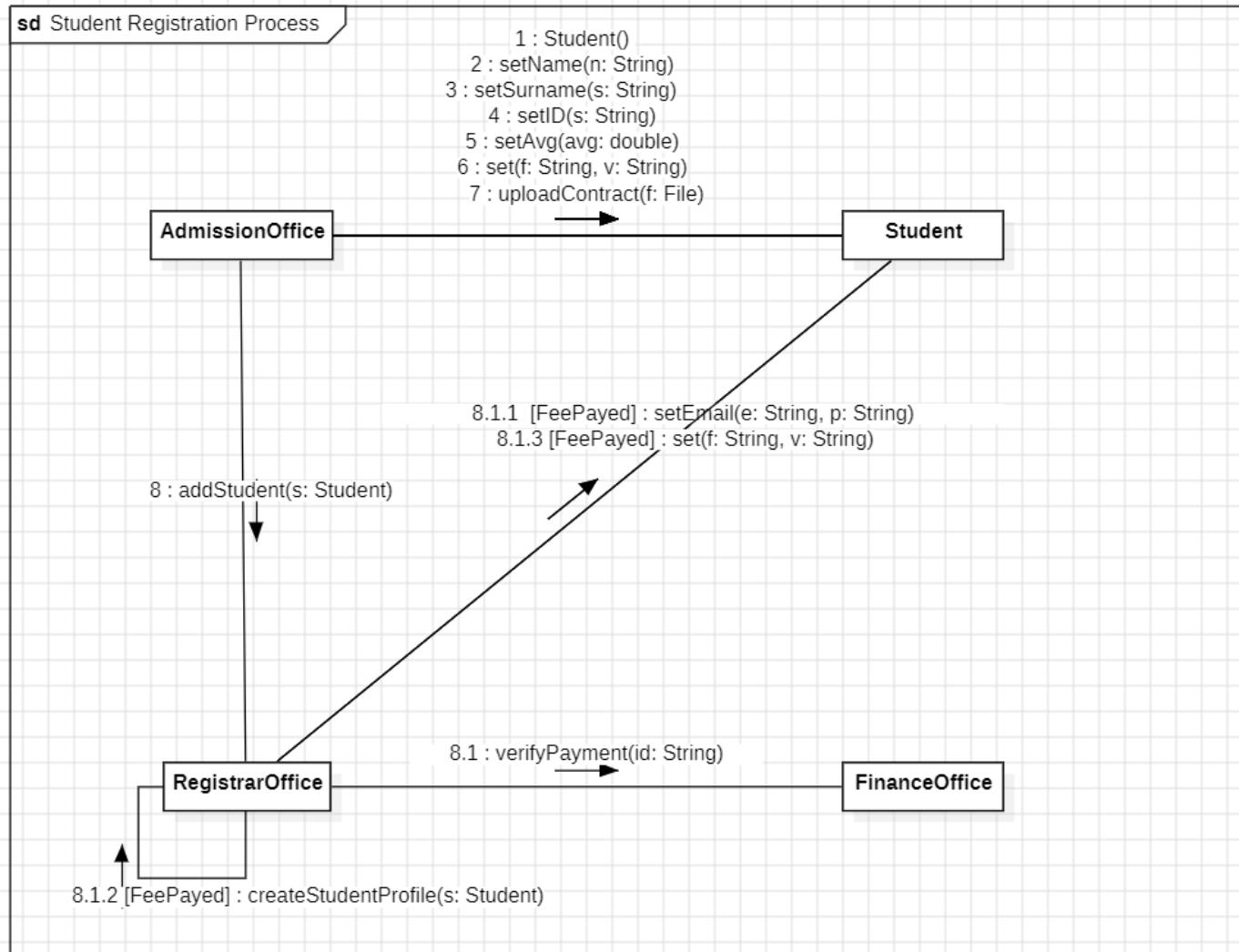
Sequence Diagram – ThinkLink-SeD-20



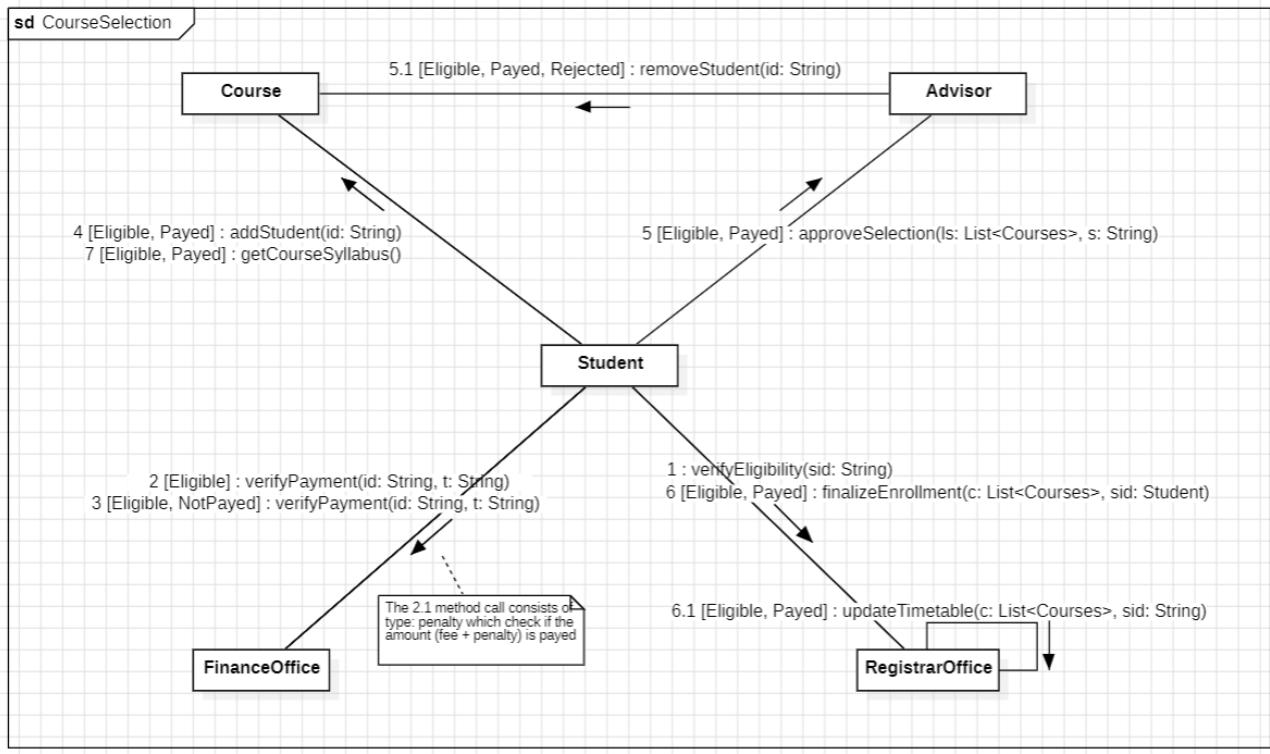
Sequence Diagram – ThinkLink-SeD-21



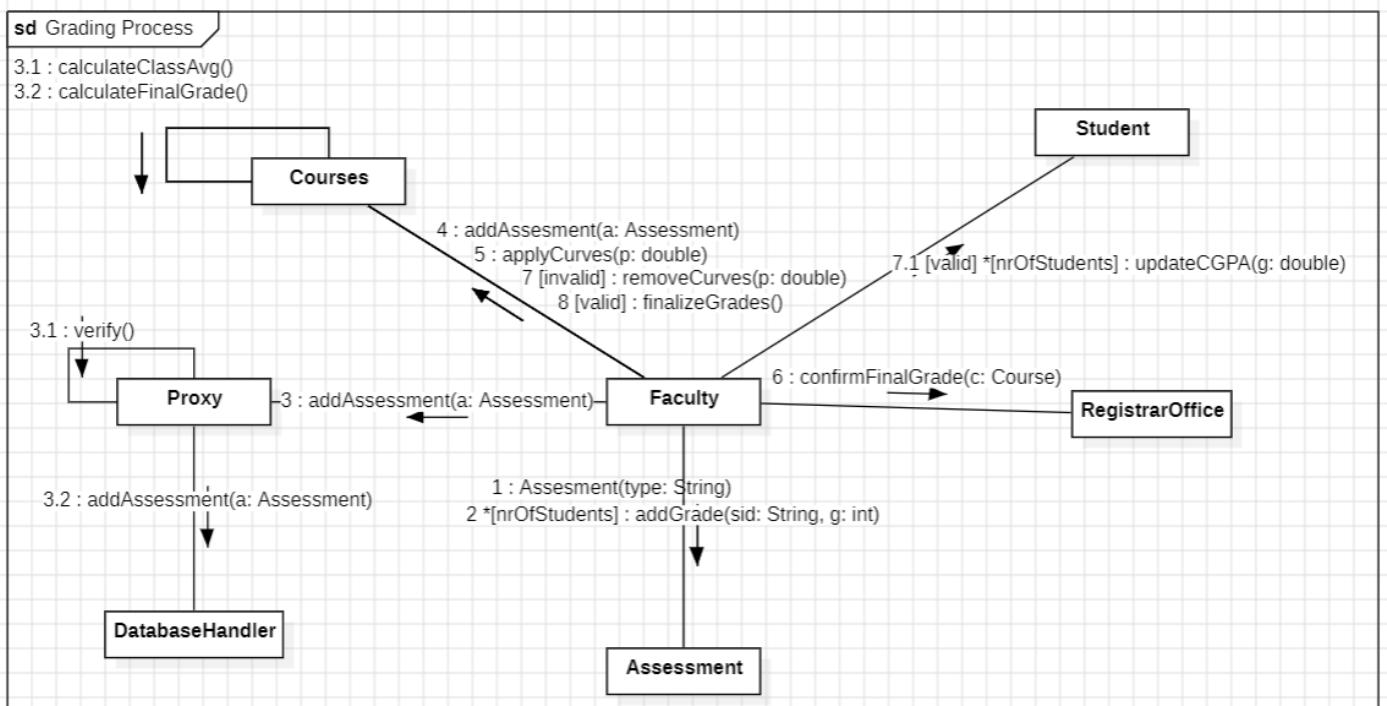
Communication Diagram – UIS-CD-1



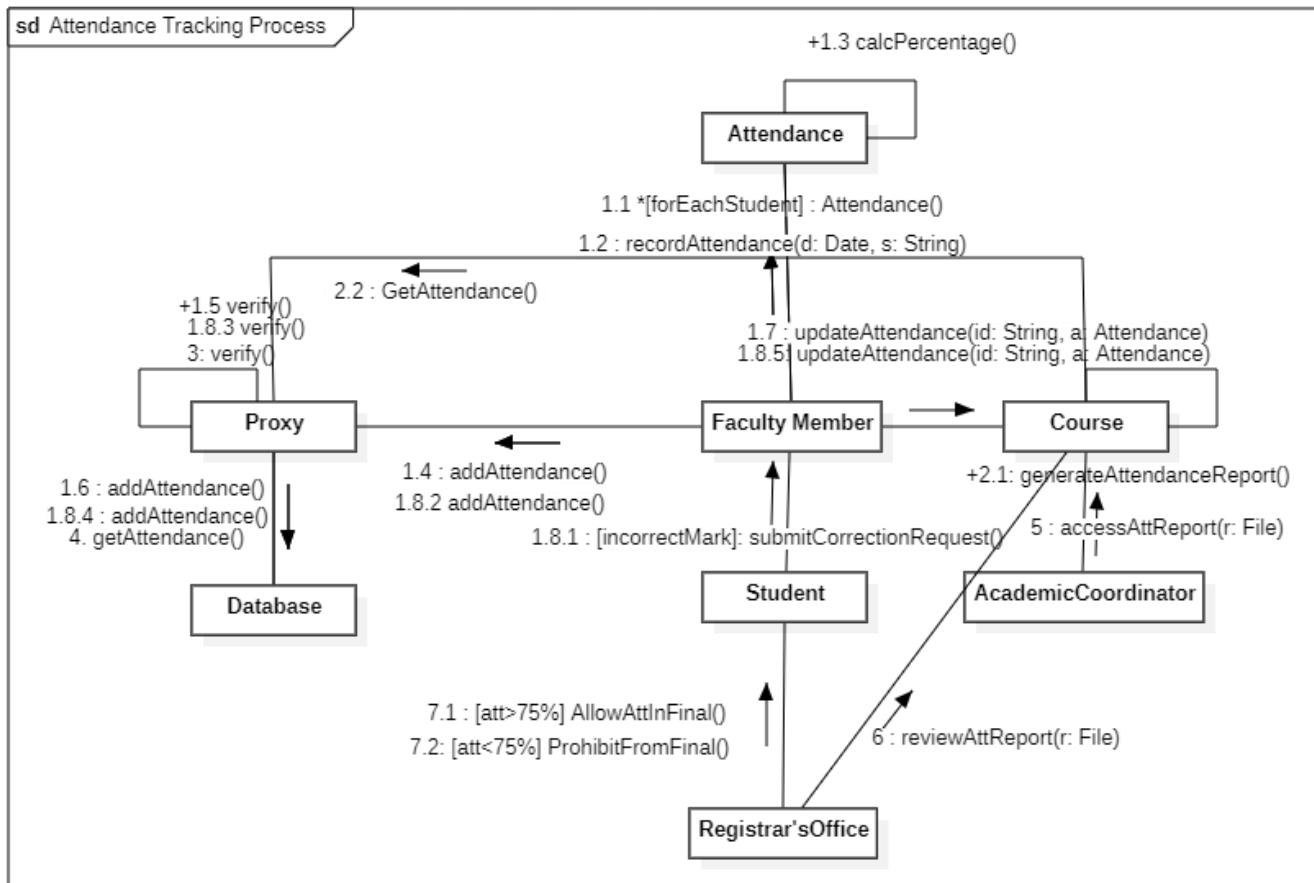
Communication Diagram – UIS-CD-2



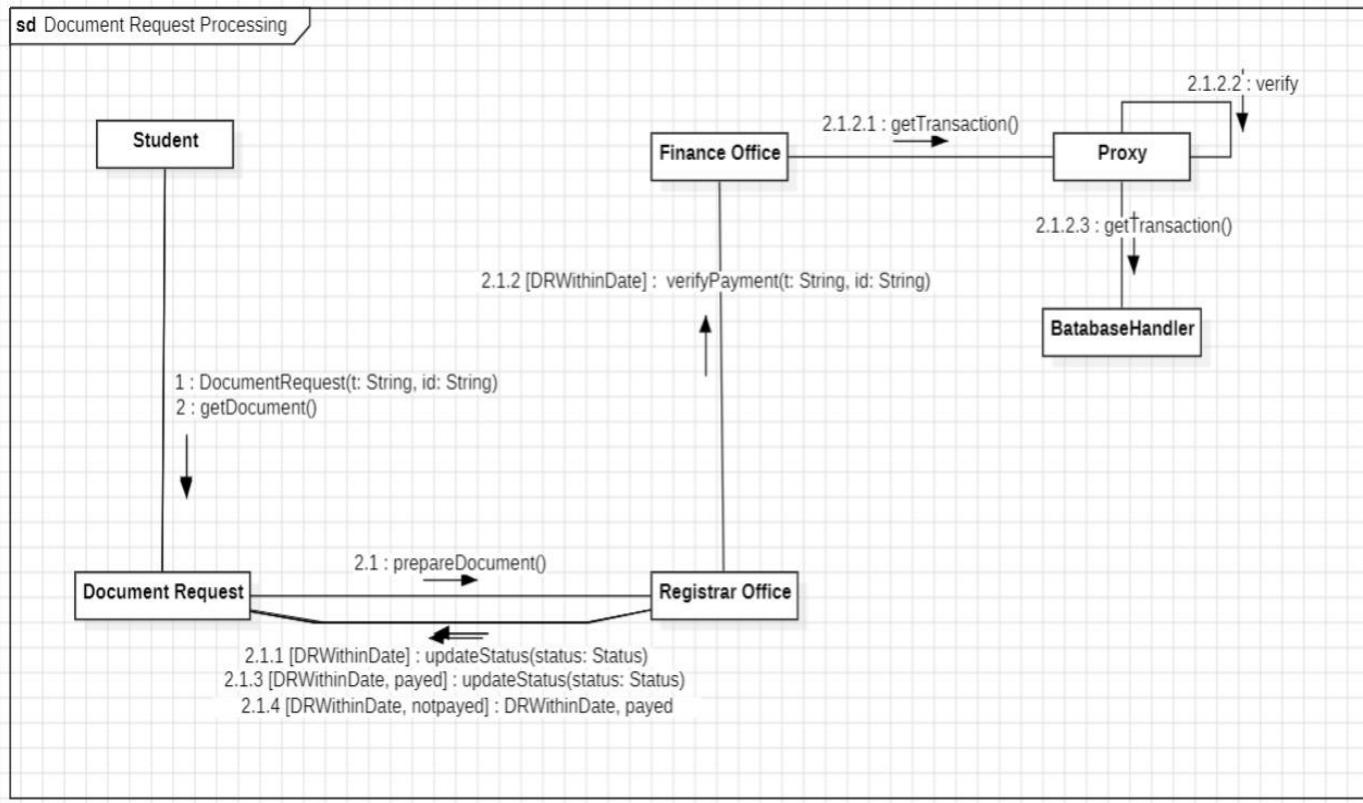
Communication Diagram – UIS-CD-3



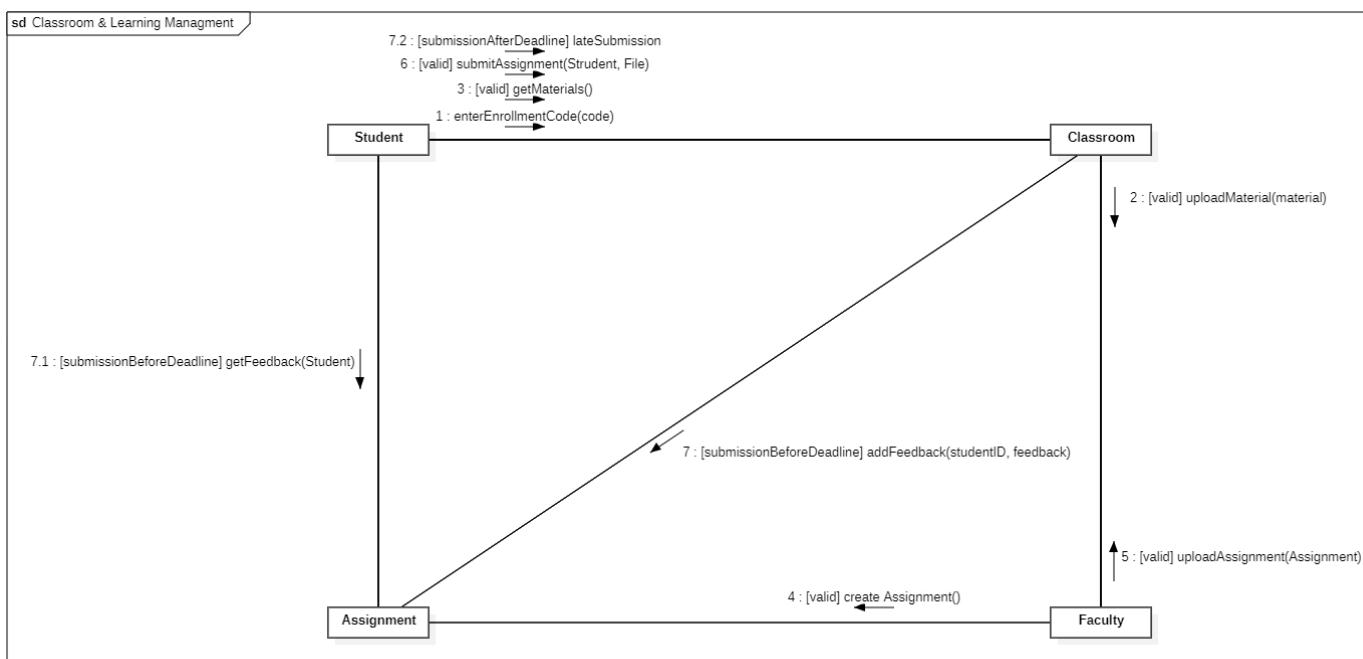
Communication Diagram – UIS-CD-4



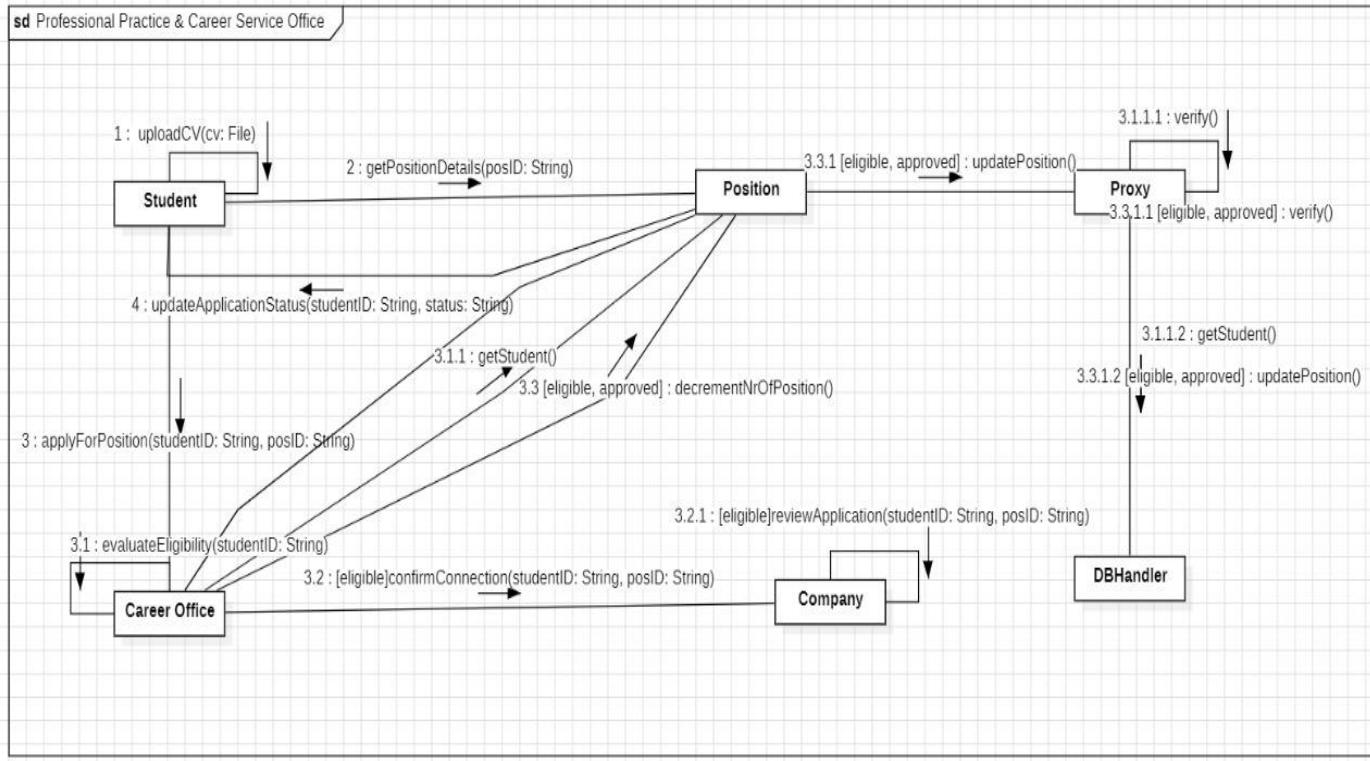
Communication Diagram – UIS-CD-5



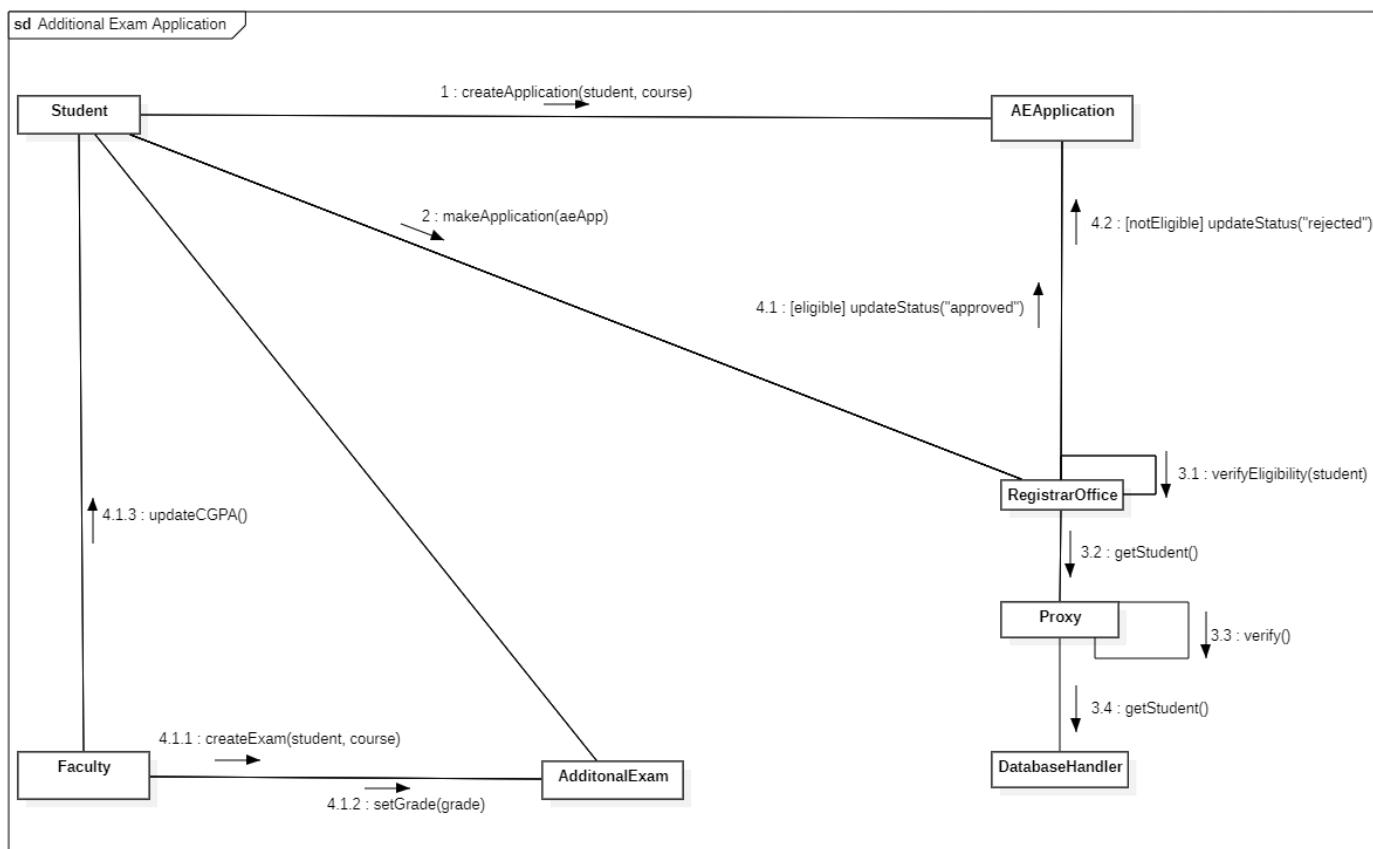
Communication Diagram – UIS-CD-6



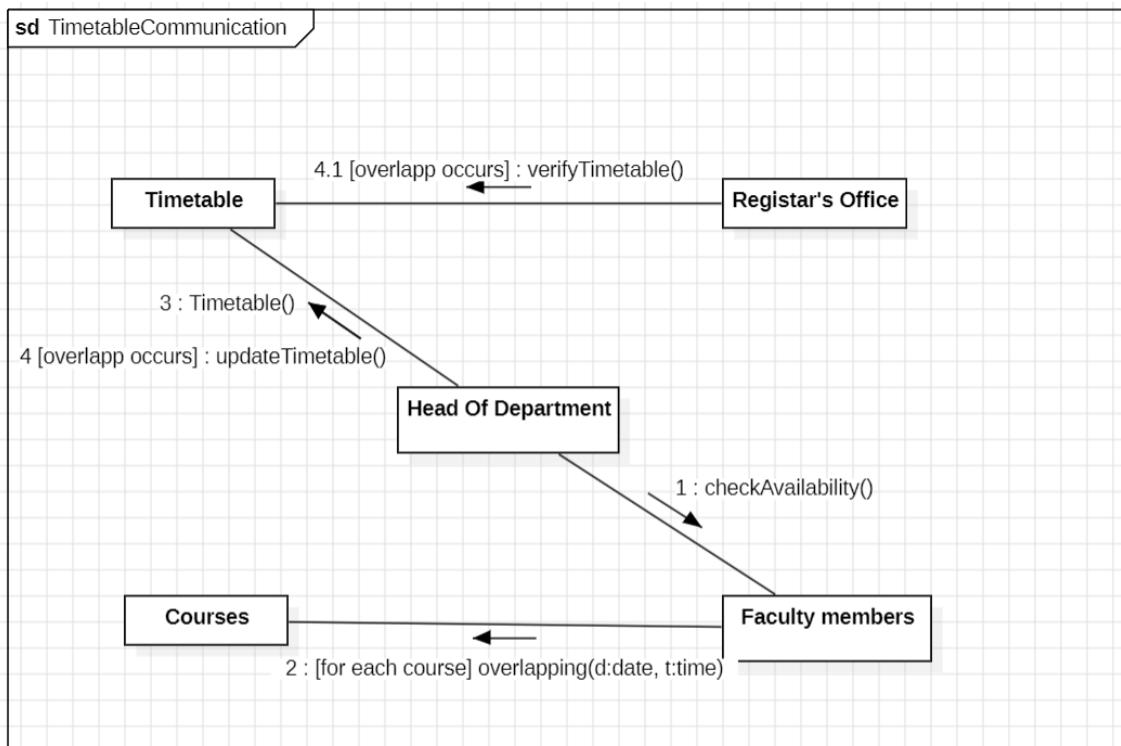
Communication Diagram – UIS-CD-7



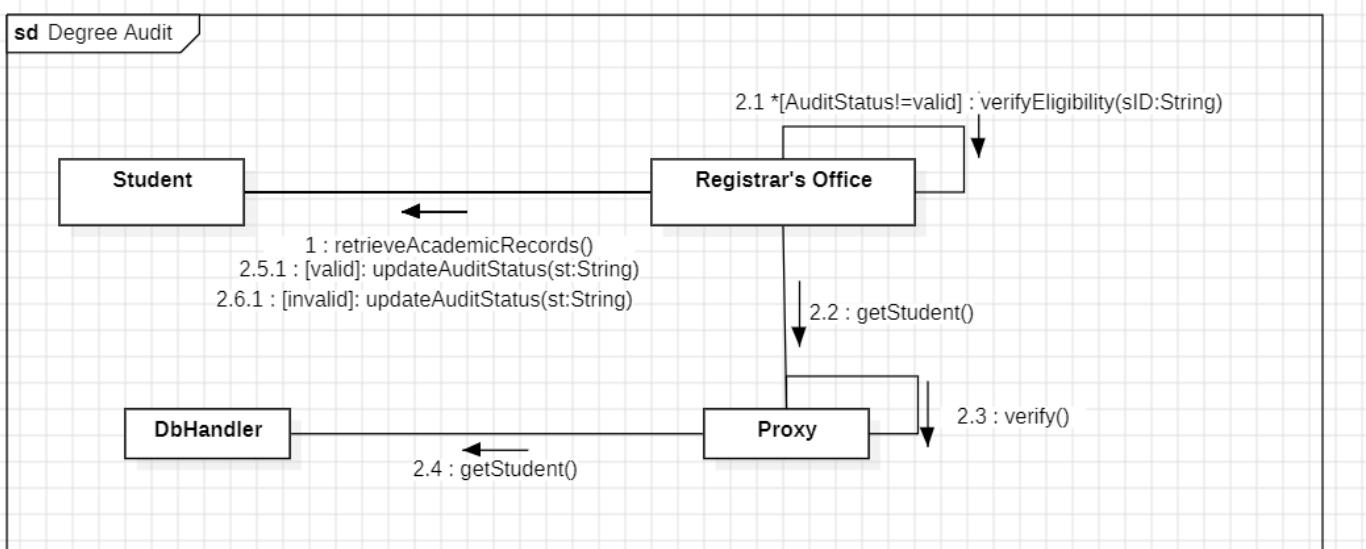
Communication Diagram – UIS-CD-8



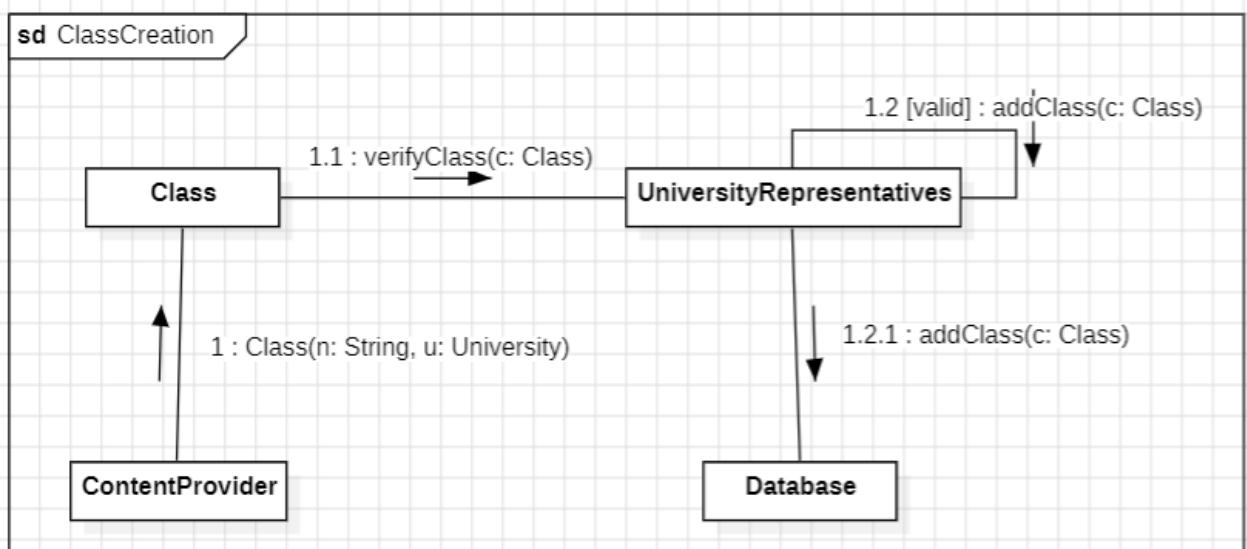
Communication Diagram – UIS-CD-9



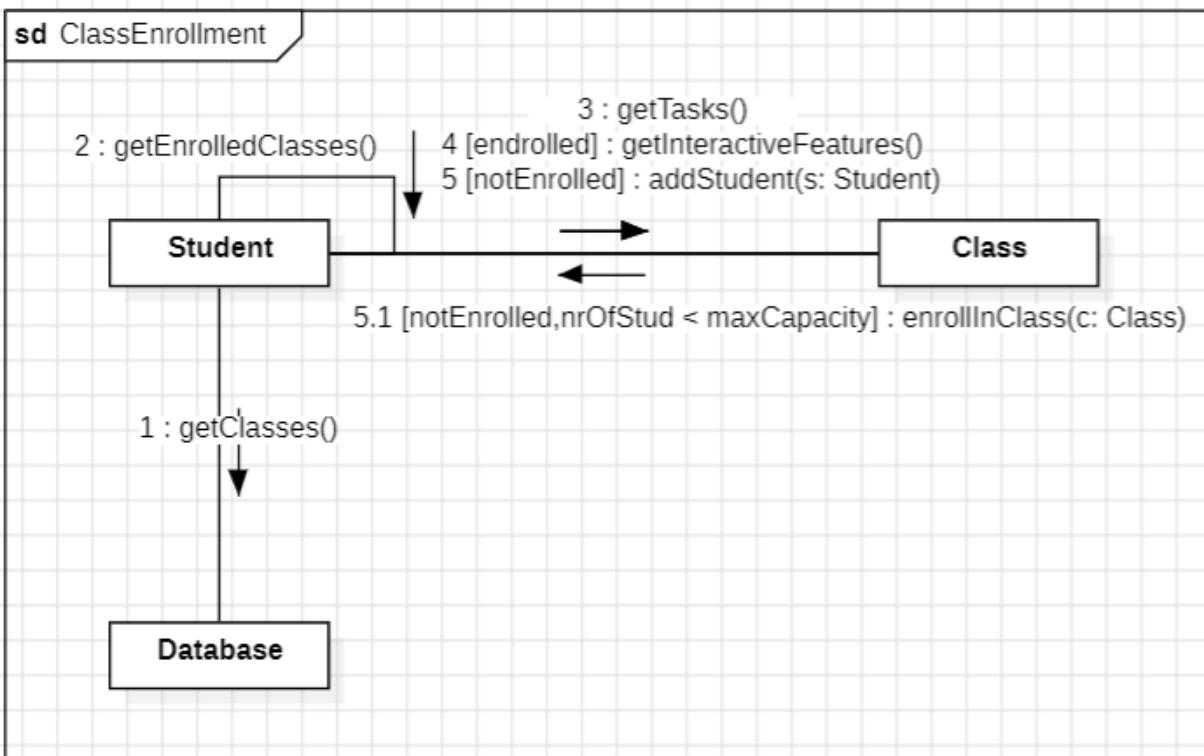
Communication Diagram – UIS-CD-10



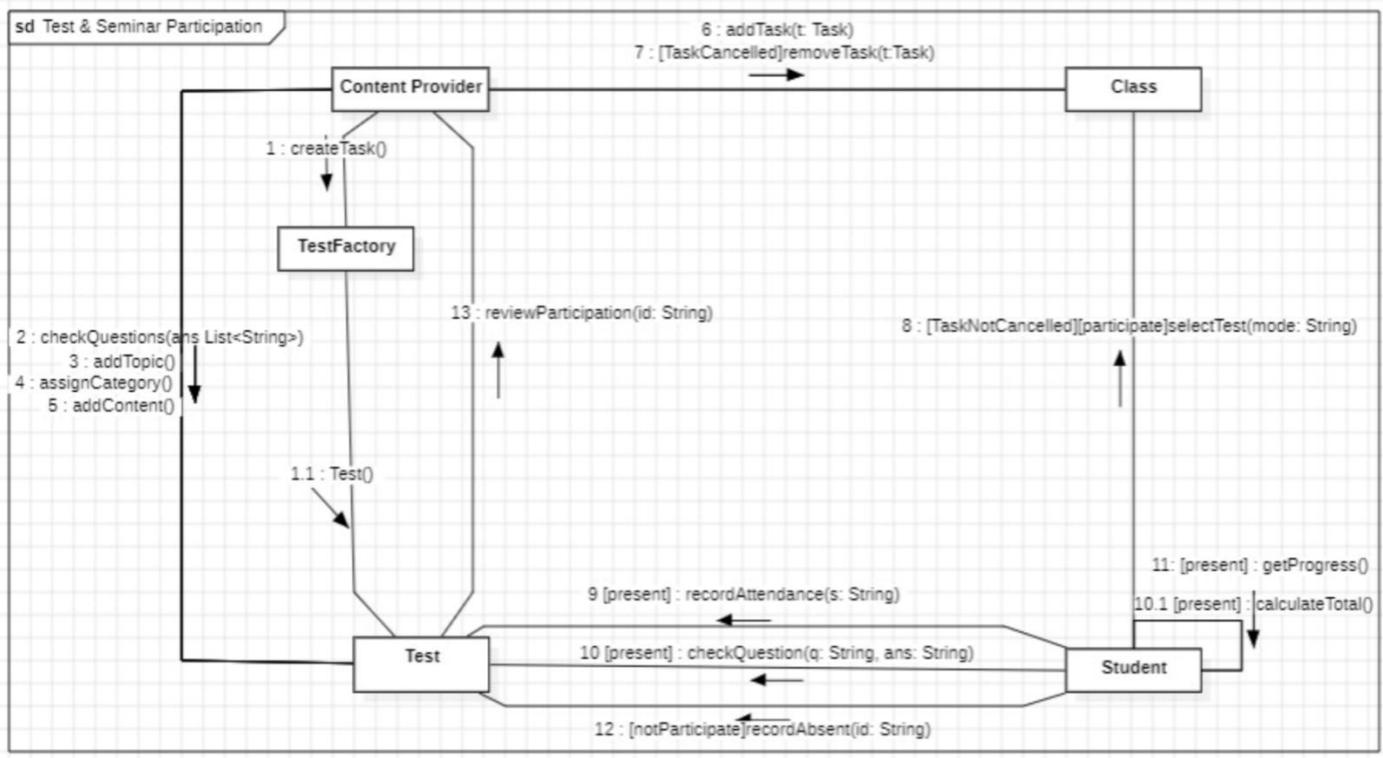
Communication Diagram – ThinkLink-CD-1



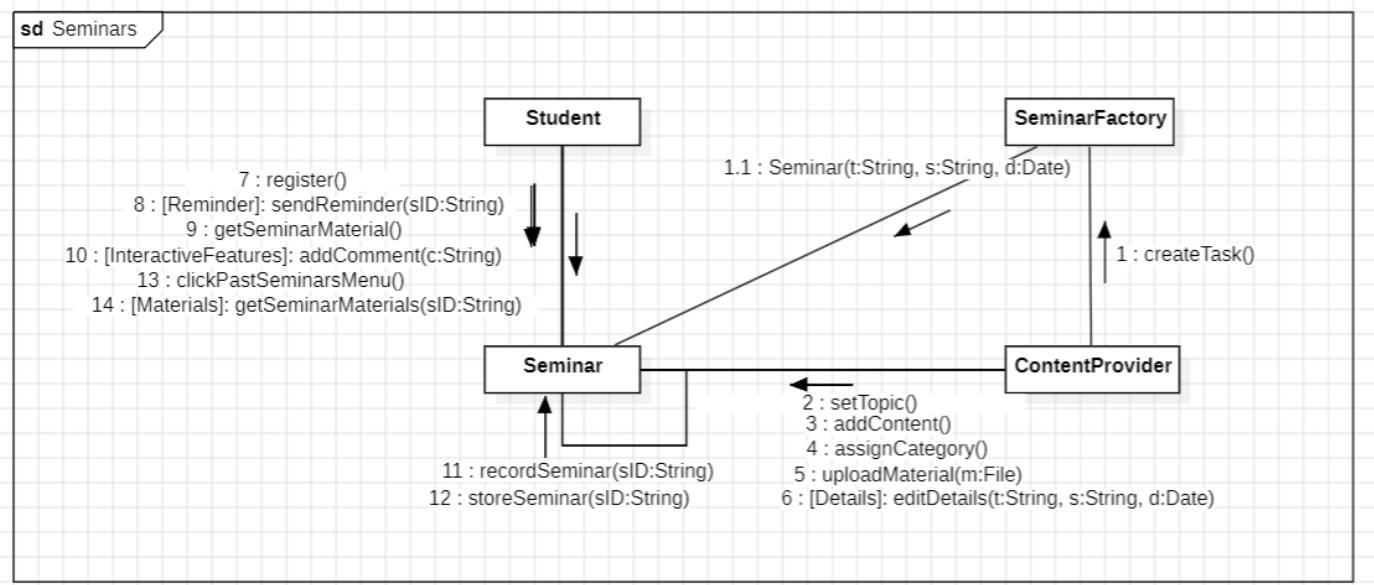
Communication Diagram – ThinkLink-CD-2



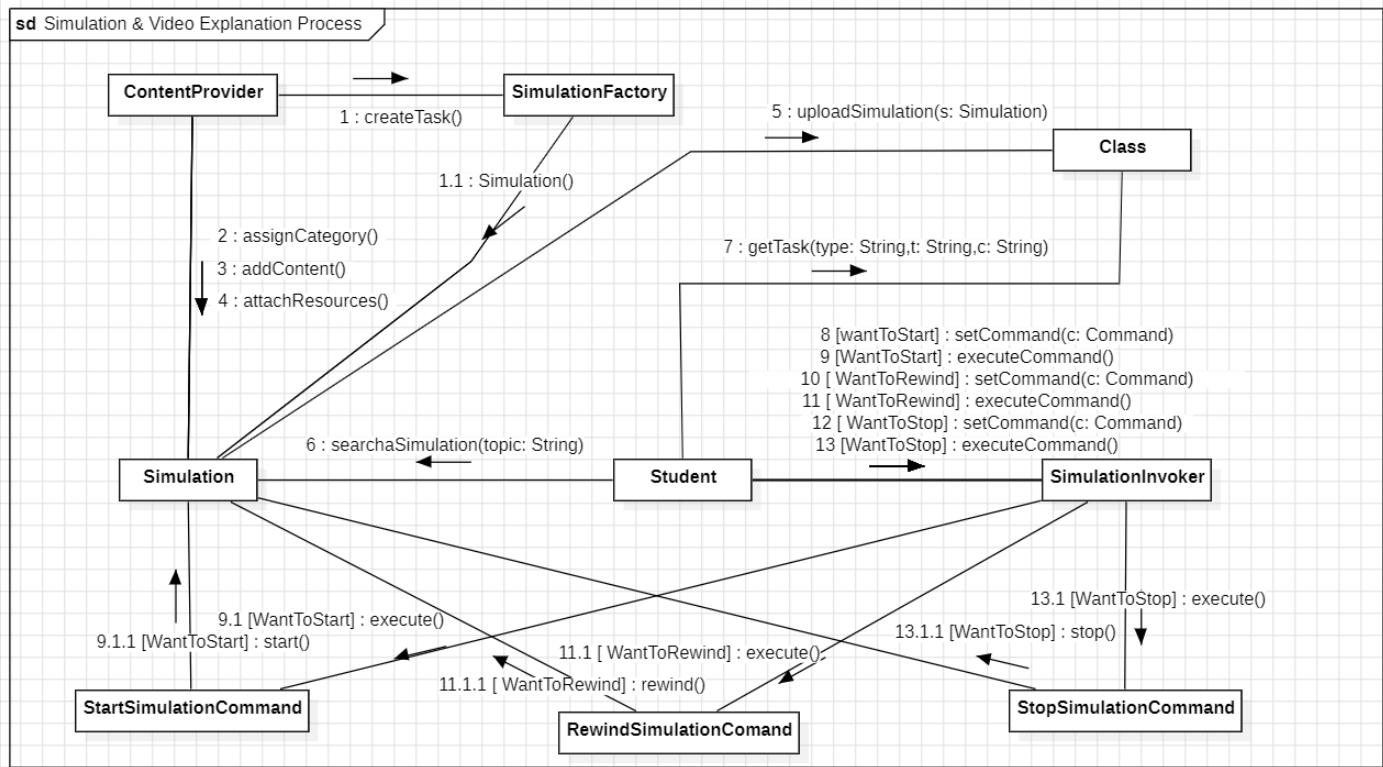
Communication Diagram – ThinkLink-CD-3



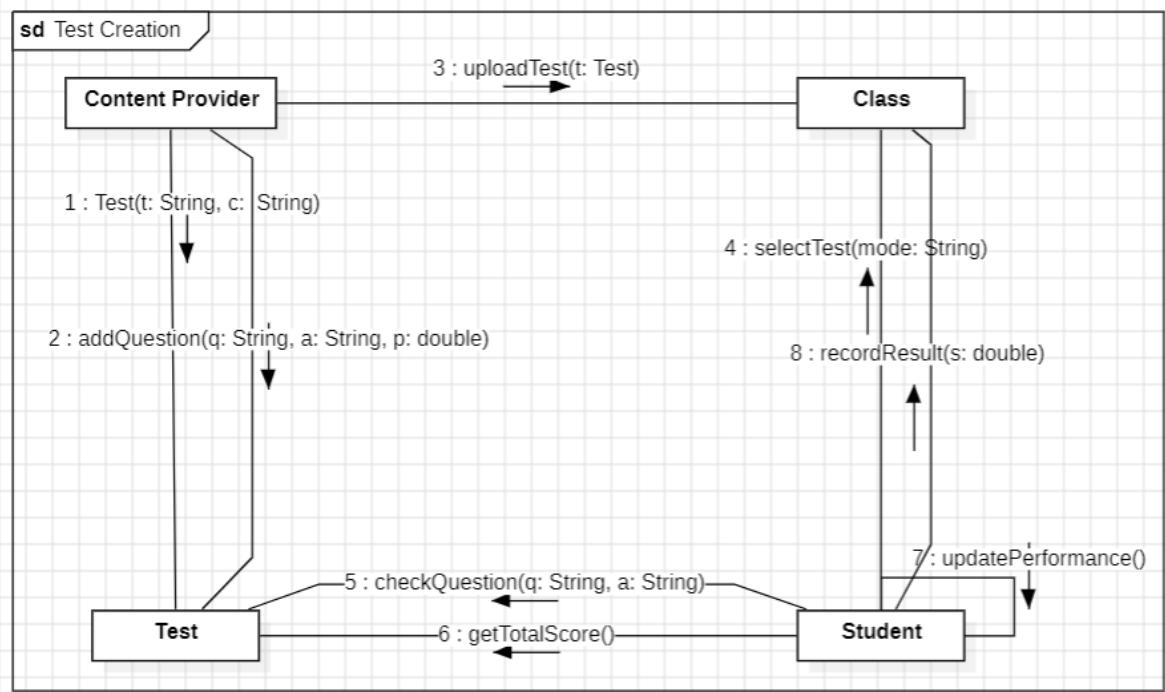
Communication Diagram – ThinkLink-CD-4



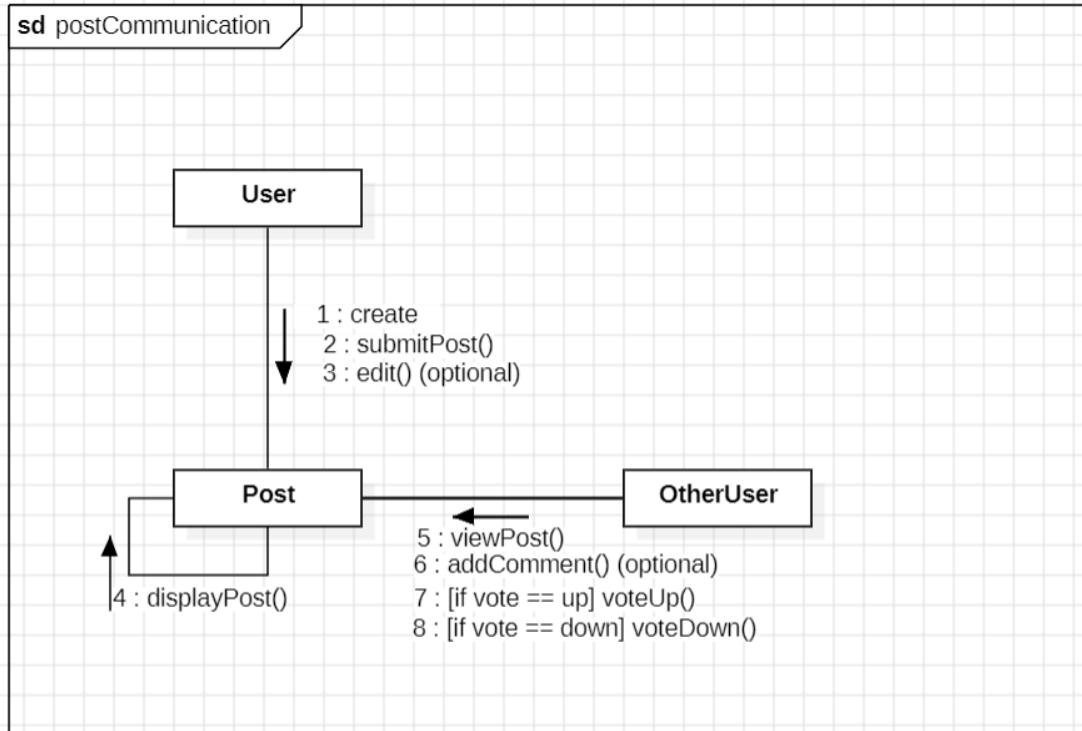
Communication Diagram – ThinkLink-CD-5



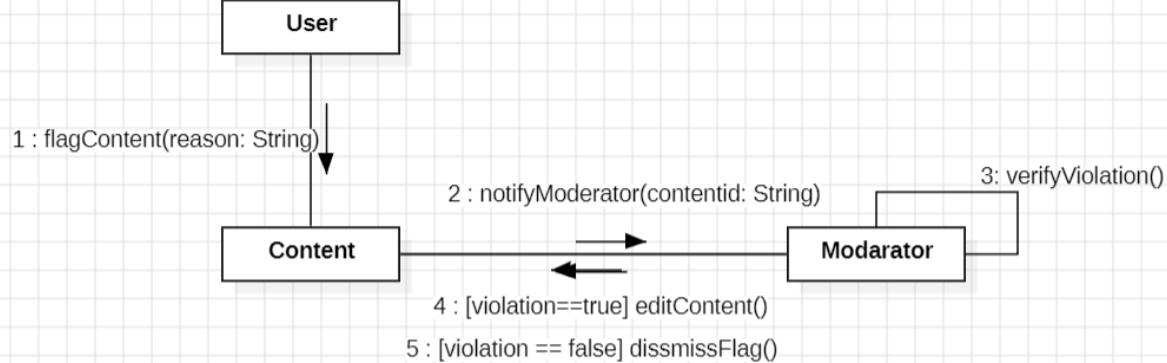
Communication Diagram – ThinkLink-CD-6



Communication Diagram – ThinkLink-CD-7

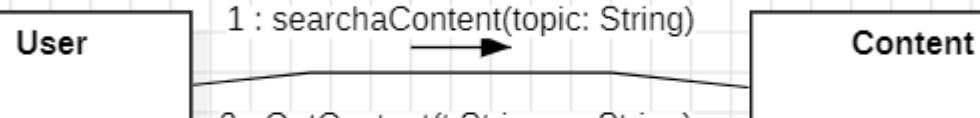


Communication Diagram – ThinkLink-CD-8

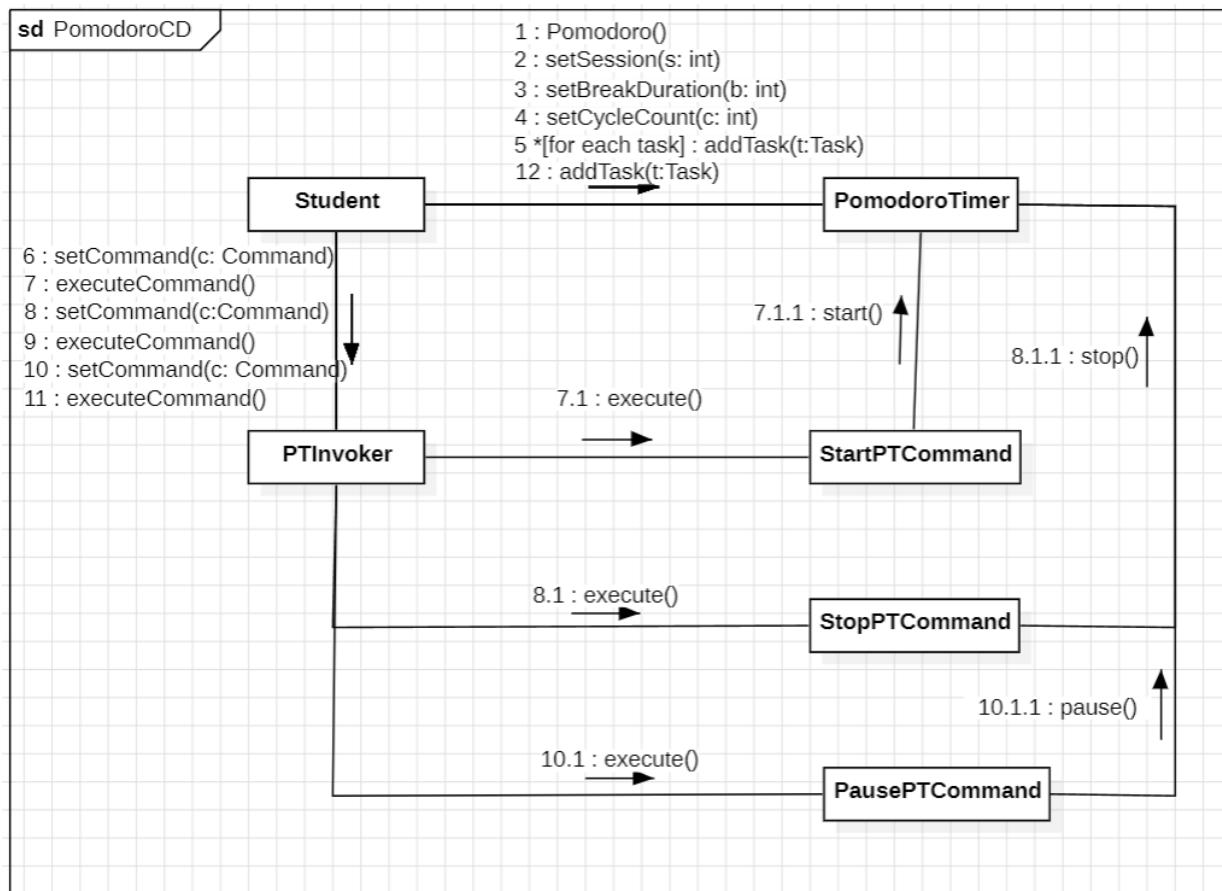


Communication Diagram – ThinkLink-CD-9

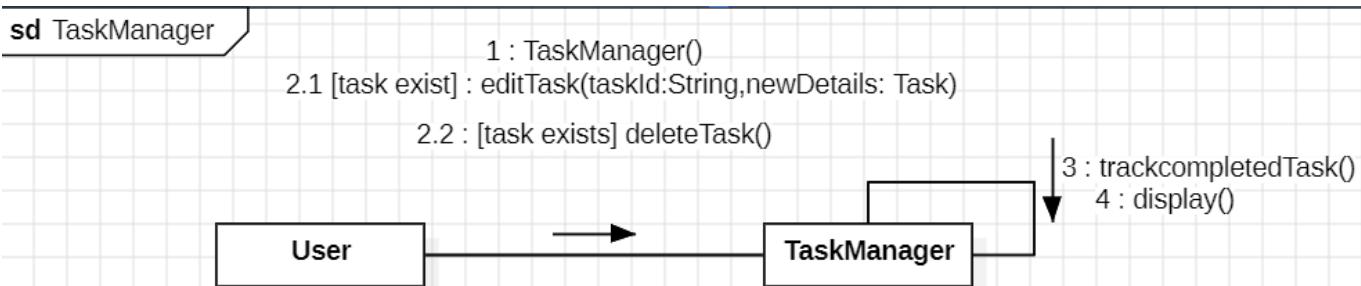
sd Search & Discover Content Process



Communication Diagram – ThinkLink-CD-10

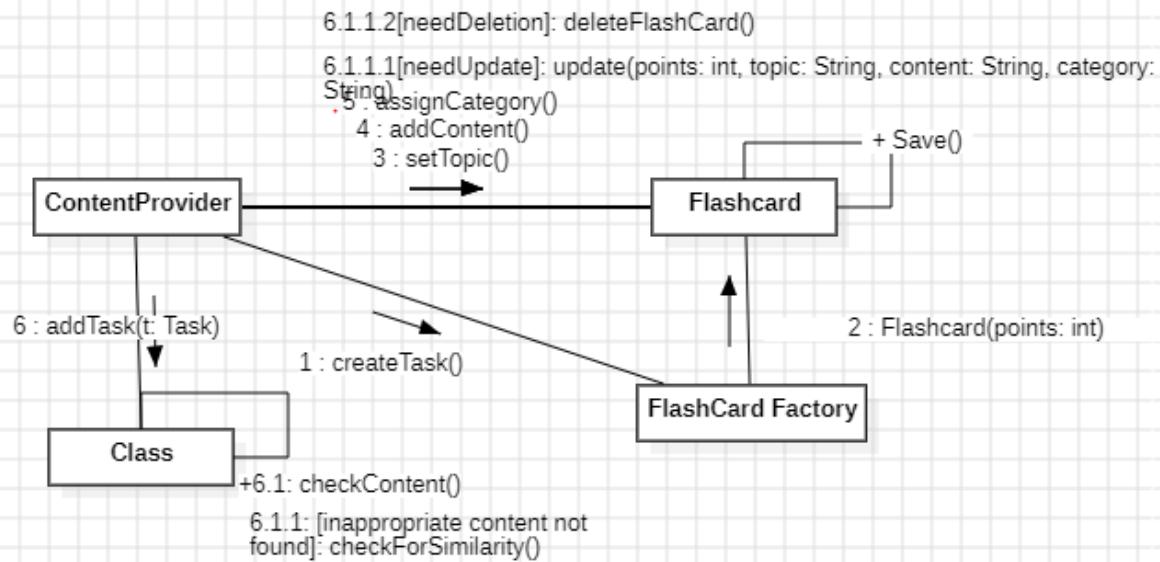


Communication Diagram – ThinkLink-CD-11

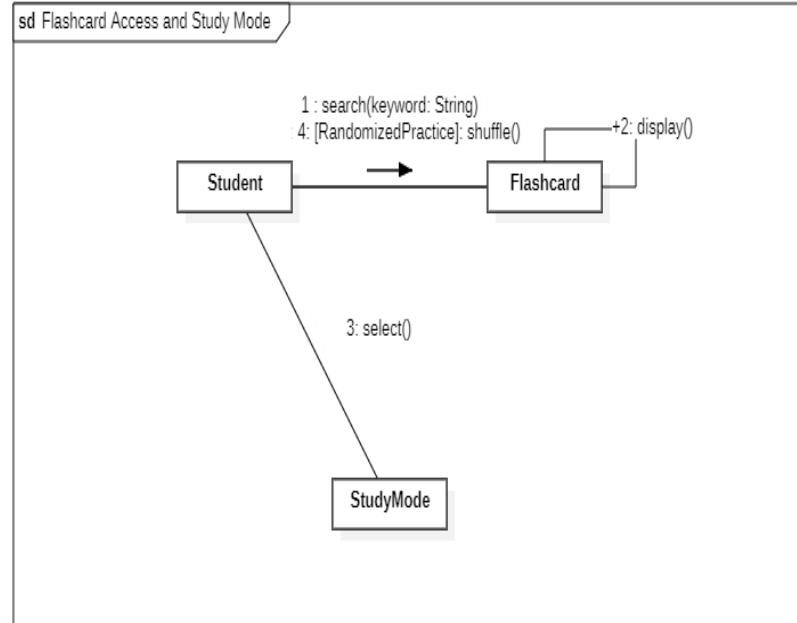


Communication Diagram – ThinkLink-CD-12

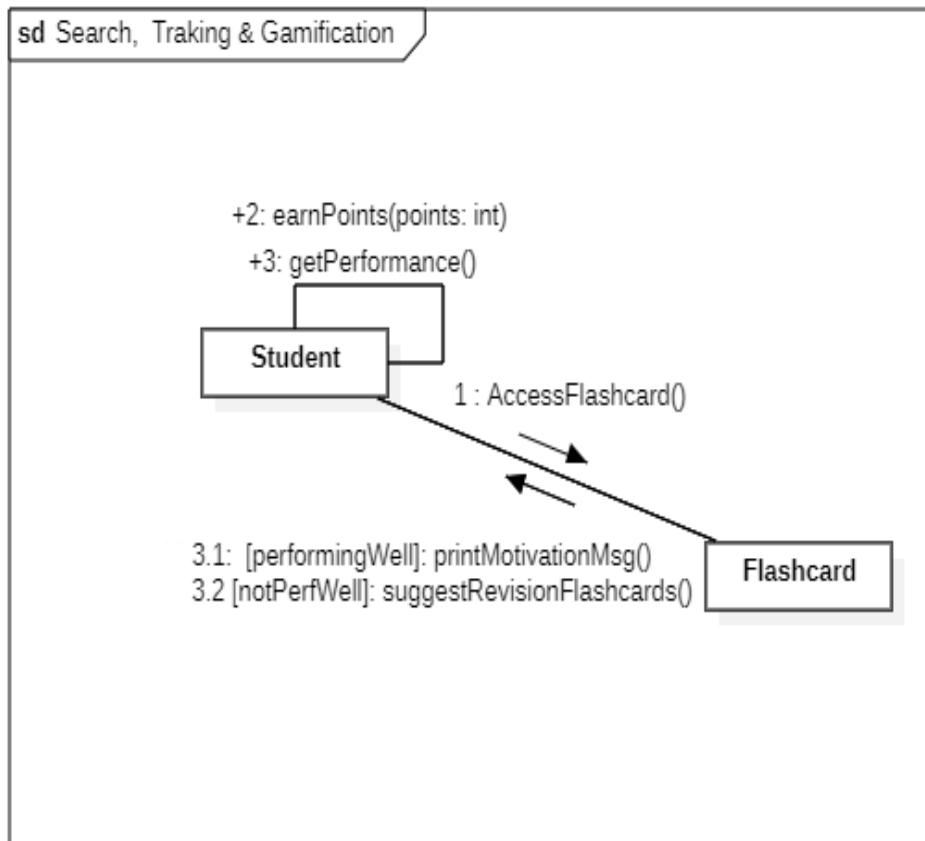
sd Flashcard Creation & Management



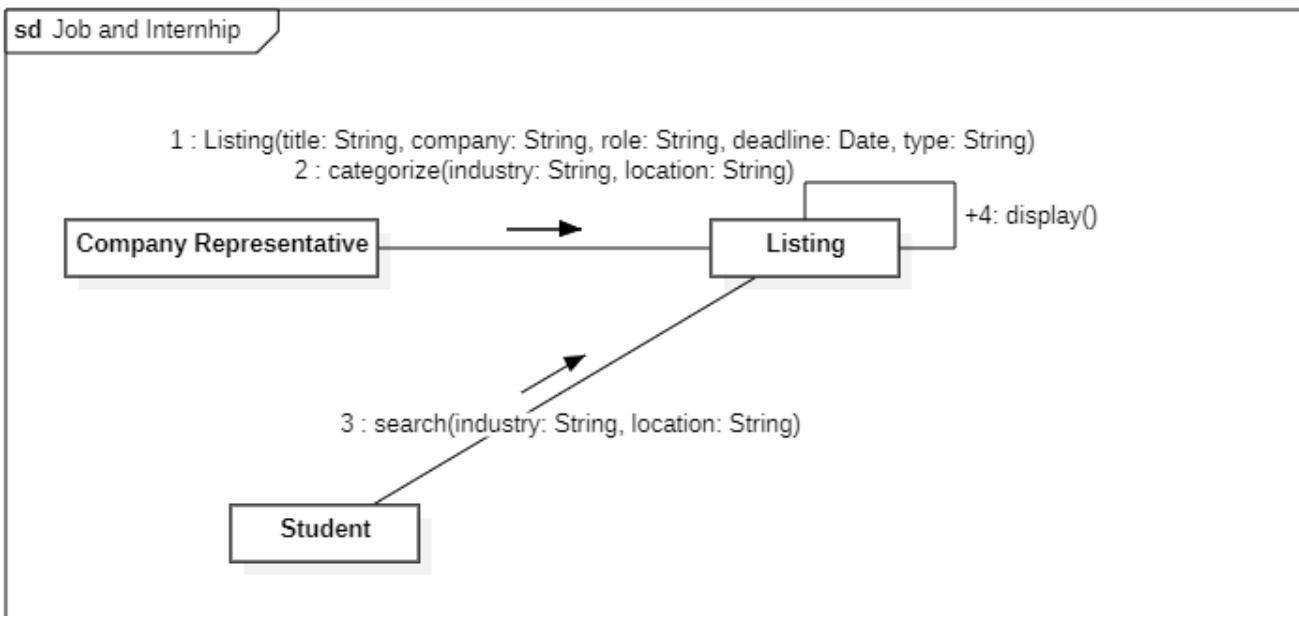
Communication Diagram – ThinkLink-CD-13



Communication Diagram – ThinkLink-CD-14



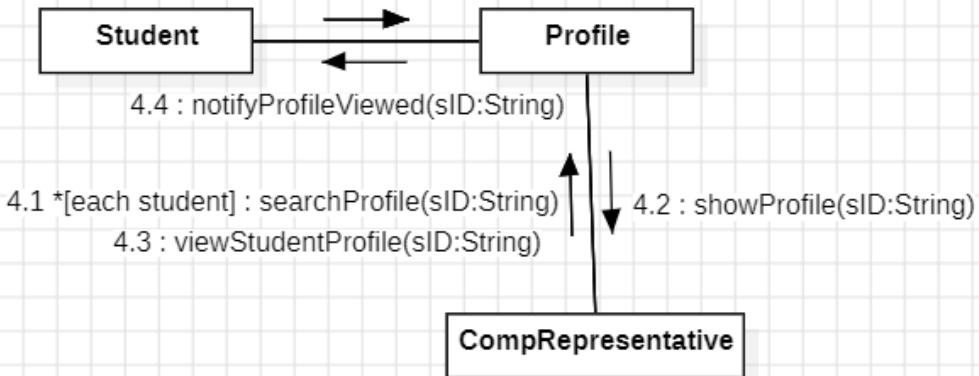
Communication Diagram – ThinkLink-CD-15



Communication Diagram – ThinkLink-CD-16

sd Profile Creation

1 : Profile(e:String, s:String, wExp:String)
2 : submitProfile()
3 : [Profile Update] editProfile(updates:File)



Communication Diagram – ThinkLink-CD-17

sd Search & Application Process

1 : uploadCV(cv: File)

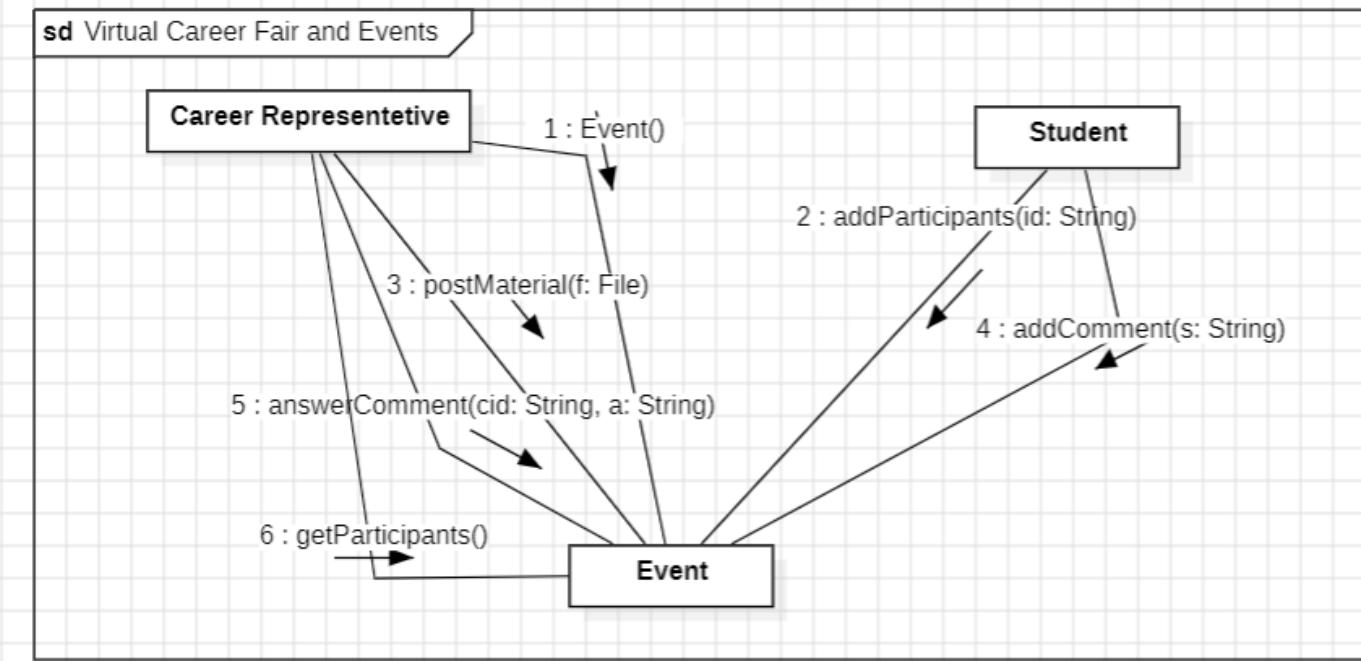
2 : verifyApplication(s: Student) : boolean

2.1 : [Application Approved]addApplication(s: Student, app: boolean)

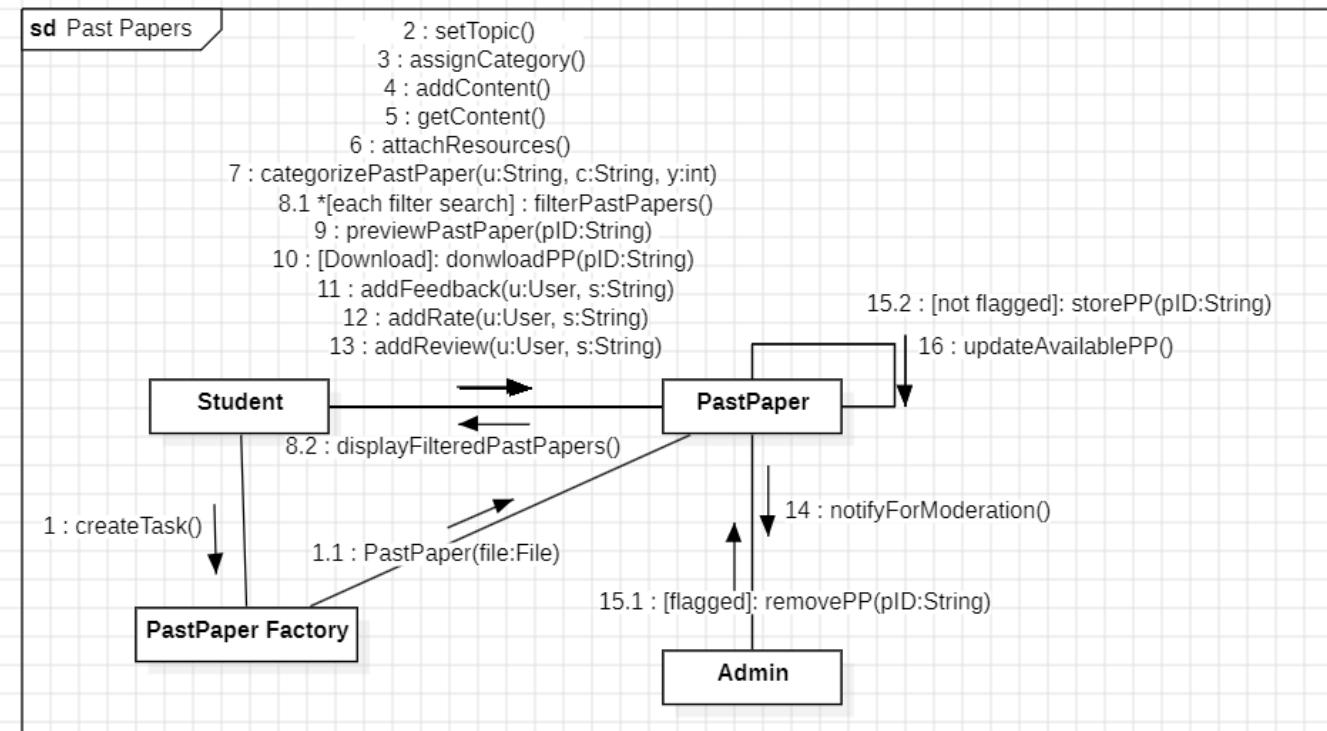
Student

Company

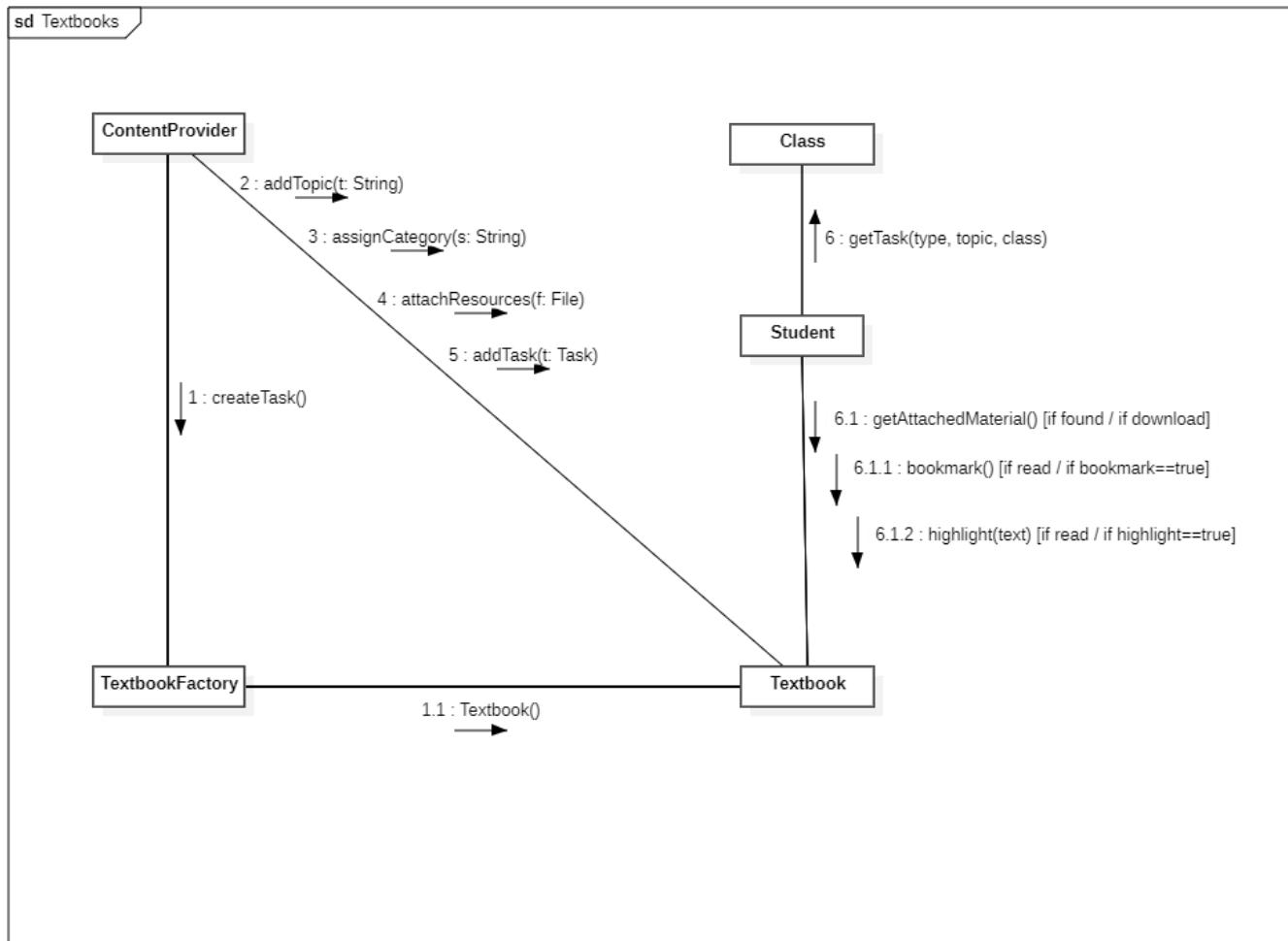
Communication Diagram – ThinkLink-CD-18



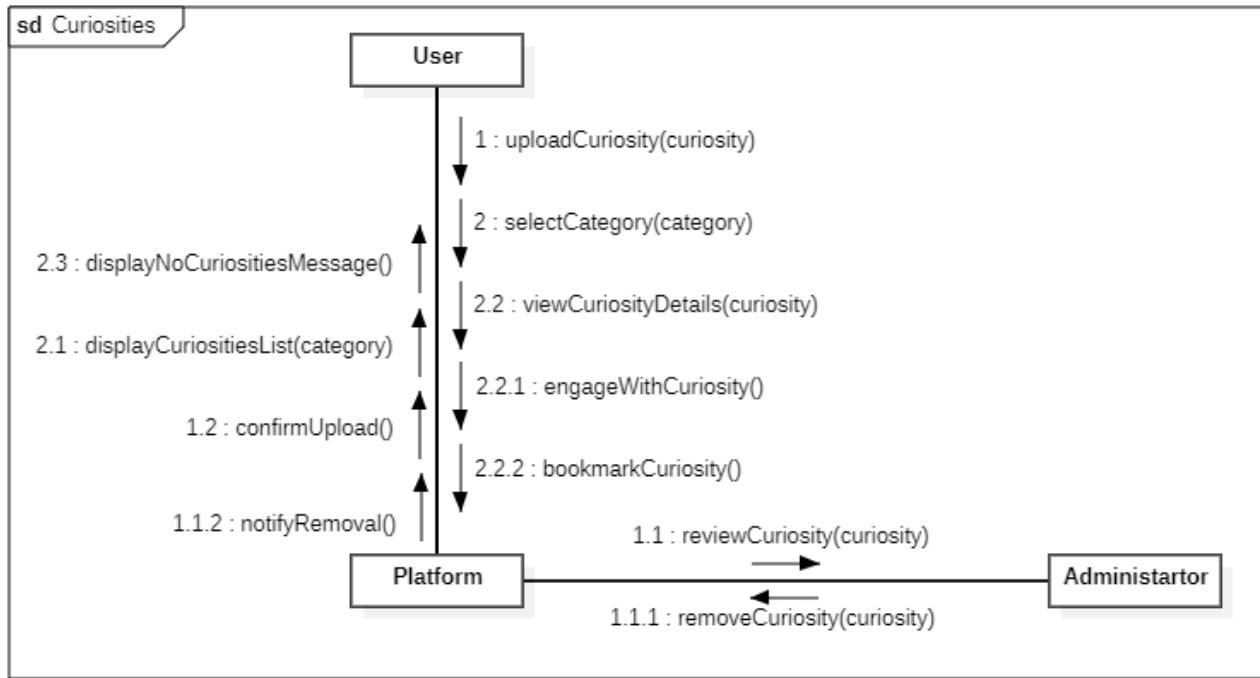
Communication Diagram – ThinkLink-CD-19



Communication Diagram – ThinkLink-CD-20



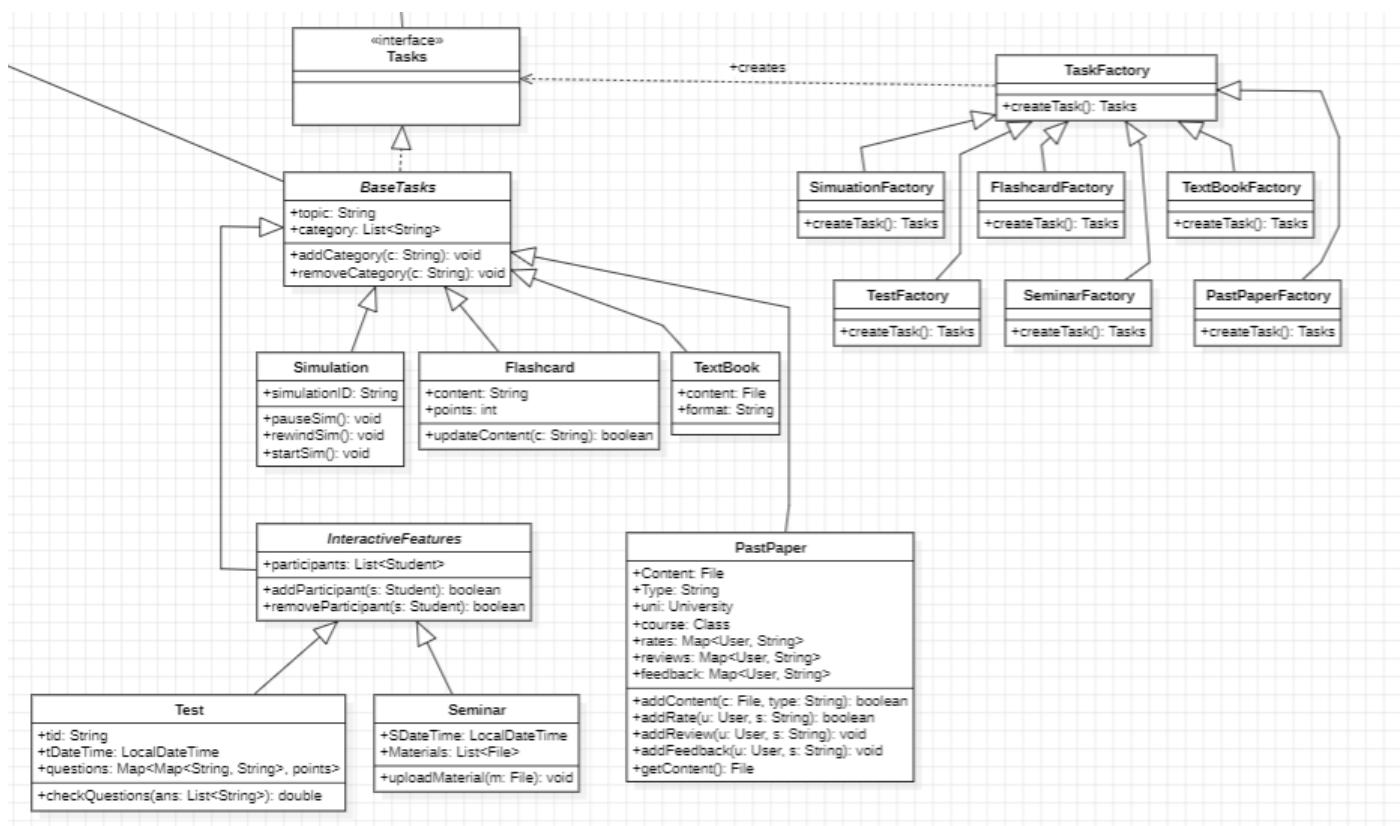
Communication Diagram – ThinkLink-CD-21



Design Patterns – Factory Method

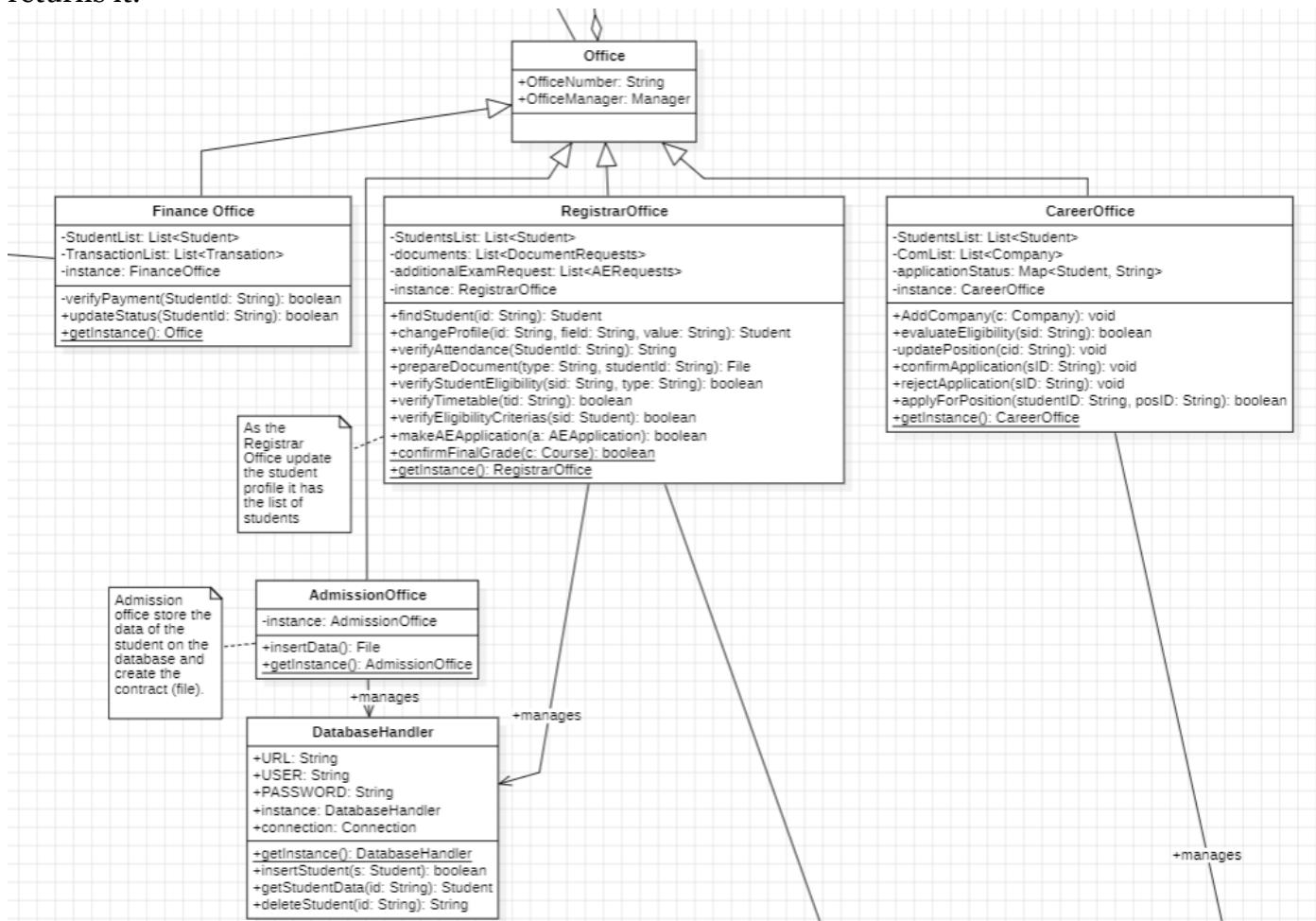
The factory design pattern is shown on the image below:

- The Task declares the interface that is common to all objects that will be created by TaskFactory and its subclasses.
- The BaseTasks declares the abstract class that is implemented by all subclasses, which has the common attributes and behaviors of all tasks.
- All the subclasses of BaseTasks are concrete Tasks that will be created, (InteractiveFeatures is an abstract class and the superclass of Test and Seminar, that are the concrete classes).
- All the concrete classes have their Factory and TaskFactory is their base class.



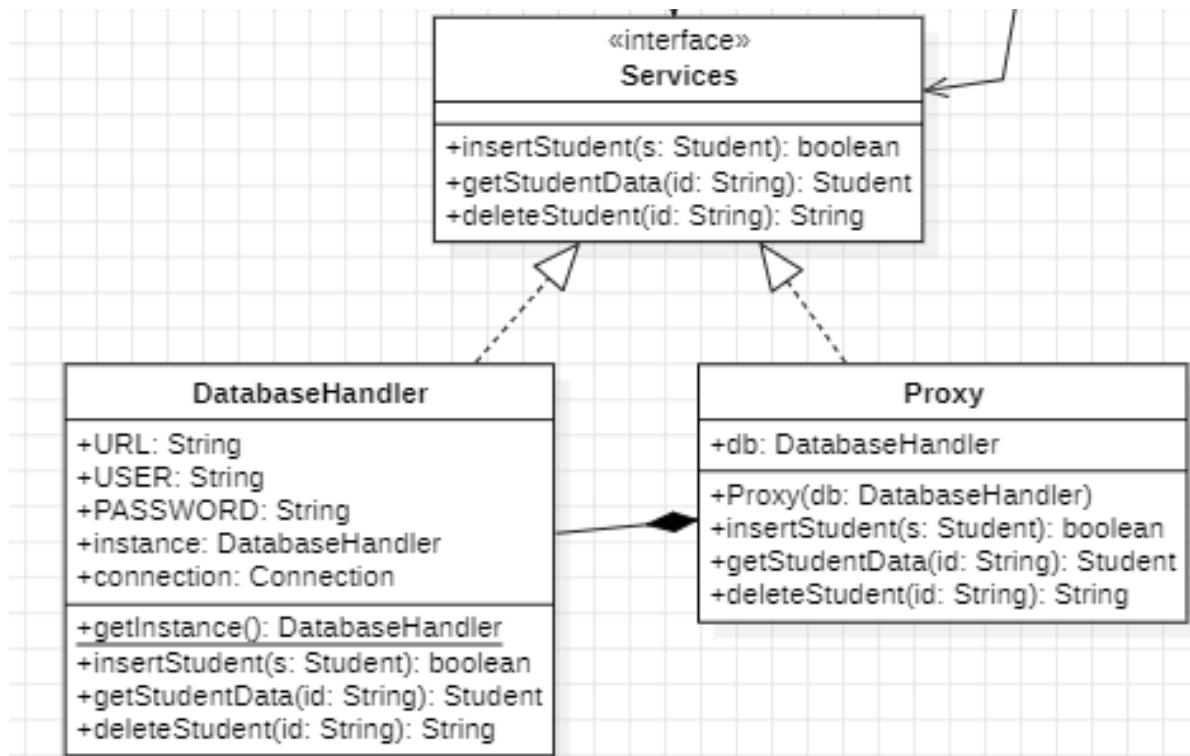
Design Patterns – Singleton

This is a small slice of the class diagram where there are shown all the classes where the Singleton Design pattern is applied. The reason of that is on each university we have only one Office of a certain type. For example, there is only one Registrar office on each university. There is a private data field, ‘instance’ which contains the only existence of that Office. The public method getInstance() return the instance if it is different from null, otherwise it creates an instance, assign it to the data field and returns it.



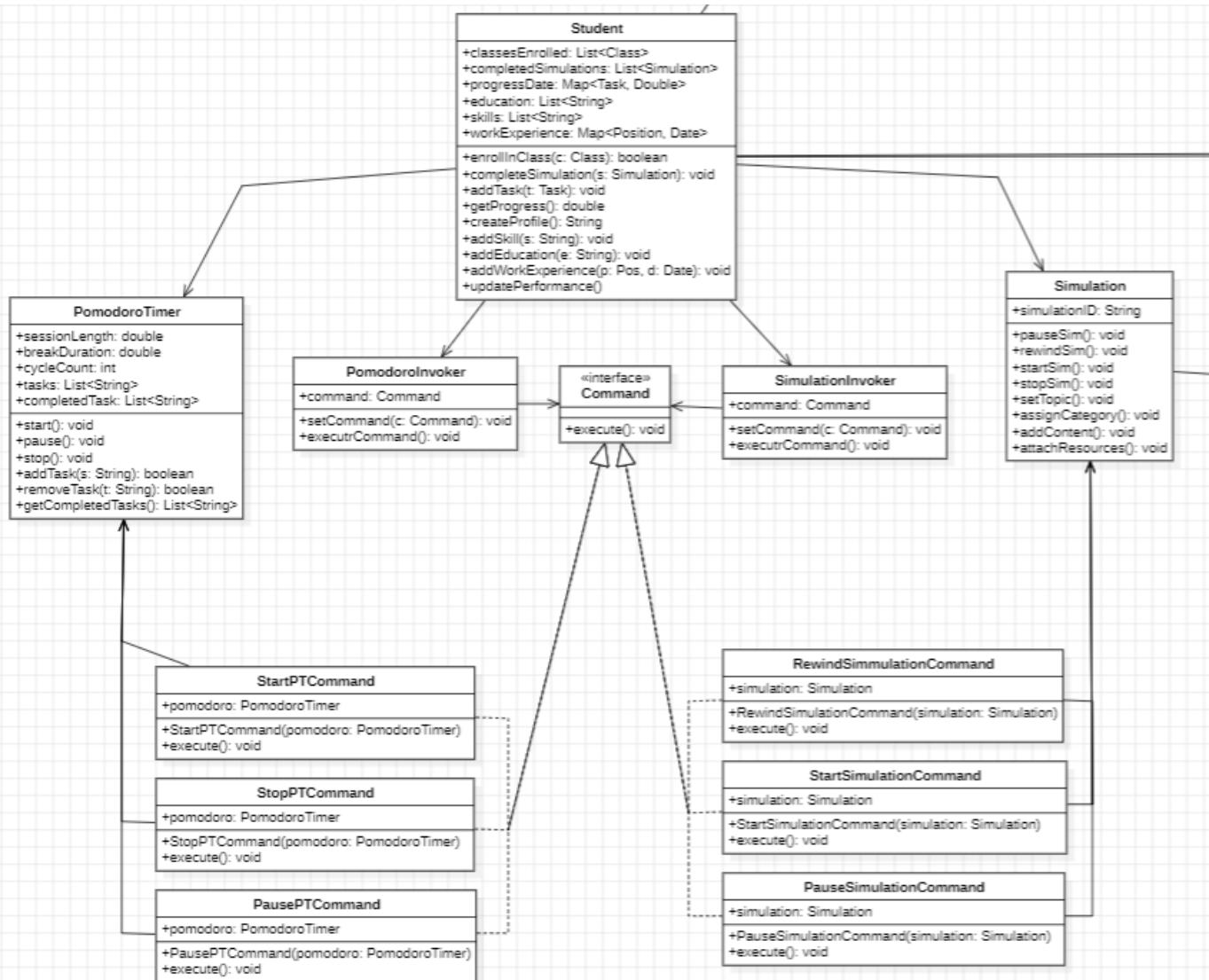
Design Patterns – Proxy

The Proxy design pattern serves as a filter to avoid direct communication with the database. The communication with the database is done only through proxy and no direct communication exists.



Design Patterns – Command

In the Command Design Pattern, we have the student who is the initiator of the command; the invoker, which in this case is either a keyboard button or a button on the screen; the Command Interface that is implemented by all the commands and the Pomodoro Timer itself. The invoker rather than calling the method in the pomodoroTimer directly it actually trigger a certain command. The reason for that is that this action is performed by both the buttons on the screen and the keyboard.



Design Patterns – Template Method

This Design Pattern serves as complement of the Factory Method Design Pattern. On this Design pattern we have the BaseTasks that serve as the base to build the concrete classes. This consist of a set of methods which can be called or not for each instance.

